MARINE RECORD

ESTABLISHED 1878.

VOL. XXIII, No. 41. CLEVELAND---OCTOBER 11, 1900---CHICAGO. $2.00 Per Year. 5c. Single Copy

LAKE CARRIERS' ASSOCIATION.

To consider and take action upon all general questions relating to the navigation and carrying business of the Great Lakes, maintain necessary shipping offices and in general to protect the common interests of Lake Carriers, and improve the character of the service rendered to the public.

PRESIDENT.
W. C. FARRINGTON, Buffalo.

1ST VICE-PRESIDENT
CAPT J. G. KEITH, Chicago.

SECRETARY.
CHARLES H. KEEP, Buffalo.

TREASURER.
GEORGE P. MCKAY, Cleveland.

COUNSEL.
HARVEY D. GOULDER, Cleveland.

EXECUTIVE AND FINANCE COMMITTEE.
JAMES CORRIGAN, Chairman, Cleveland.

COMMITTEE ON LEGISLATION.
GIBSON L. DOUGLAS, Chairman, Buffalo.

COMMITTEE ON AIDS TO NAVIGATION.
GEORGE P. MCKAY, Chairman, Cleveland.

THE WORLD'S SHIPPING.

Lloyd's Register, the new edition of which has just appeared, gives as usual, a vast amount of valuable statistics relating to the mercantile marine of the entire world. There are now 28,422 vessels having a tonnage of 29,043,728. Great Britain has 10,838 vessels and her tonnage is 14,261,254. From this it will be seen that the numerical proportion of British ships is not so great as is the case with some other conntries, because the greater part of her ships are of larger size than those of other nations, and more of them are steam vessels. It is gratifying to note that the United States comes next to the British Empire. We have 3,135 vessels, with a tonnage of 2,750,271; Germany has 1,710 vessels having a tonnage of 2,650,033. Then comes Norway with 2,380 vessels with a tonnage of 1,640,812; then France, with 1,214 vessels, having a tonnage of 1,350,562, and Italy with 1,176 vessels having a tonnage of 983,655; Sweden has a greater number of vessels than France, having 1,433, but as the vessels are smaller, the tonnage is only 637,272. Japan has 1,066 vessels, the tonnage being 574,557; Holland, 406 vessels with a tonnage of 530,277; Denmark has 802 vessels with a tonnage of 519,011; Austria-Hungary, 270 vessels with a tonnage of 416,084. Greece, Brazil, Belgium, Portugal and Chile all have a tonnage in excess of 100,000. The steam tonnage of the British merchant navy is superior to that of all other countries combined, but nearly half of the tonnage of the United States is made up of sailing vessels. Great Britain has more than 1,600 steamers of 3,000 tons and upward. Germany has 127 of the same size; the United States 120, and France 60. Great Britain now has 24 steamers with a register of 10,000 tons or more.

THE IRON TRADE OF 1901.

Price McKinney, of Cleveland, O., of the ore and vessel firm of Corrigan, McKinney & Co., takes a very cheerful view of the season of 1901 for the iron industry. He thinks that next season will be characterized by a good demand for iron and steel products, that prices will rule steady and a general condition of good times prevail.

"The present iron situation," said Mr. McKinney, "is full of uncertainties. It will not be surprising if it continues so until the end of the present year. Ore buying for next year's delivery will probable be late and the same will probably be true of chartering boats for the next season. We may go into next year on a comparatively low basis for finished products but I think it will be a big year for the iron manufacturers. Much construction that was talked of for this year was put off on account of high prices for iron and lumber which have prevailed until recently. Other causes have operated to delay construction of various kinds in different parts of the country, and everything points to a condition for next year which will encourage extensive improvements. It will be a year of fair prices and extensive operations from present appearances. I do not look for much change until after the presidential election but I believe that by January 1 it will be admitted by everybody that a year of great activity is ahead. The demand for pig iron at present is light, notwithstanding the shutdown of some of the furnaces. Consumers are waiting until they are sure of their ground as far as prices are concerned before placing extensive orders. In the meantime they are buying according to their needs."

TRAFFIC THROUGH THE ST. MARY'S FALLS CANAL.

STATISTICAL REPORT OF LAKE COMMERCE THROUGH CANALS AT SAULT STE. MARIE, MICHIGAN AND ONTARIO, FOR THE MONTH OF SEPTEMBER, 1900.

EAST BOUND

Articles.		U. S. Canal.	Canadian Canal.	Total.
Copper	net tons	17,418	902	18,320
Grain	bushels	1,395,489	202,000	1,597,489
Building stone	net tons	7,018	610	7,628
Flour	barrels	907,252	132,786	1,040,038
Iron ore	net tons	2,151,593	132,214	2,283,807
Iron, pig	net tons	3,485	.....	3,485
Lumber	M. ft. B. M.	134,633	1,879	136,512
Silver ore	net tons	110	.....	110
Wheat	bushels	3,651,025	638,081	4,289,106
General mdse	net tons	12,152	1,209	13,361
Passengers	number	2,495	1,869	4,364

WEST BOUND.

Coal, hard	net tons	43,139	2,400	45,539
Coal, soft	net tons	412,833	62,321	475,154
Flour	barrels	50	.....	50
Grain	bushels	3,400	.....	3,400
Manufactured iron	net tons	9,099	5,581	14,680
Salt	barrels	23,722	.....	23,722
General mdse	net tons	41,304	5,151	46,455
Passengers	number	2,715	1,201	3,916
Freight—				
East bound	net tons	2,647,251	177,760	2,825,011
West bound	net tons	509,989	76,453	586,442
Total freight	net tons	3,157,240	254,213	3,411,453
Vessel passages—				
Number		2,198	384	2,582
Reg'd tonnage	net tons	2,784,075	263,460	3,047,535

Compiled at St. Mary's Falls canal, Michigan, under direction of Lieut.-Col. G. J. Lydecker, Corps of Engineers, U. S. A. Joseph Ripley, Asst. Engr. and Genl. Supt.

IN naval warfare the ship which can get in the most hits in the shortest time is of the greatest strategical value. In other words, a vessel which can make 80 per cent. of hits (in a given time) is the tactical equivalent (in an engagement) of two sister ships making 40 per cent. of hits. The very raison d'etre for a ship is that she shall be able to fight efficiently. To do this, she must be able to capture or destroy her enemy. It seems to be accepted that sea fights of the future will be of short duration, and if such be an axiom, it is safe to assume that the victory will rest with the ship that gets in her hits first. If these statements are undisputed, all else on board ship should be subordinated to the training of gun pointers.

THE WATER POWER OF CANADA.

To this day Canada, although three hundred and sixty-five years have elapsed since Jacques Cartier sailed up the St. Lawrence in search of the coast of China, remains in many respects an undeveloped country. For all the years it has been known and explored, and for countless thousands of years before, its mighty rivers have rushed headlong to the sea wasting an uncounted total of power that must ultimately be available for all sorts and manners of industrial enterprises. It is only lately that due attention has been given to the magnificent resources of this character which the country possesses, and now there is going on all over the province of Ontario and Quebec an awakening of interest in water-power stimulated by the capacity of modern electrical engineering to utilize and distribute the valuable power of the many cataracts contained in that region. The St. Lawrence is partly—and every American must regret that it is not wholly—an international boundary line, and upon it and its tributaries some of the most notable developments have taken place. On the New York side, at Massena Springs, a gigantic plant capable of producing 150,000 horse-power, is nearly finished. Further down the river, at Montreal, the Lachine Rapids plant has been in operation for several years to the great satisfaction of all concerned in it. Near by, at Chambly, on the Richelieu river, is another fine plant, developing 12,000 horse-power, and further down at Three Rivers, is still another. At Quebec, the falls of Montmorency, celebrated in verse and story, have lately taken on the less poetical but more utilitarian attitude of turning water-wheels and generating electricity. The developments, as large as they are, have yet failed to abstract more than an insignificant per centage of the vast energy than is running to waste in the multitudinous cataracts of Canada. It is merely a beginning that has been made and the future that lies before the happy region blessed with such prodigal gifts of nature in the shape of an abundant and inexpensive power is almost impossible to foresee.

It is pleasant to note that many of these plants have been developed by American enterprise and that practically all of them have been made possible by the use of American-made machinery. Canada has fully waked up to the immense value of this variety of its natural resources. Against it may be placed only inhospital climate of the country, which, during certain months of the year, inevitably causes more or less trouble from ice in any hydraulic development. The fact that Canada has so appreciated its own resources should be an object lesson to certain regions equally well favored with respect to natural power and comparatively blessed as regards climate and situation.

For example, the state of Georgia contains as fine water-powers as are found anywhere on the Atlantic slope of North America. These powers are in a situation practically ideal as regards climate, transportation facilities, and abundant labor. Already they are beginning to be developed, but on a scale incommensurate with their possibilities. It is gratifying to know that in New York State no effort has been spared to take advantage of the extraordinary possibilities which nature has provided in the way of rapidly flowing and swiftly descending streams. New England is a country of water-power, but so far there has been but little attempt to develop these electrically. On the Pacific coast, both of Canada and the United States, there are magnificent waterfalls simply awaiting a greater density of population in the country for a demand for their utilization as sources of power.

There seems no reason to think that Canada will not eventually be a great manufacturing country, if cheap power and an abundance of raw material can make a country great in that direction.—Electrical Review.

AROUND THE LAKES

BUFFALO.

Special Correspondence to the Marine Record.

Supt. Waterson, of the American Ship Building Co.'s Lorain yards will become general manager of the company's interests at Buffalo. Supt. Jeffrey of the Bay City yards will succeed him at Lorain.

Instead of being diverted to other ports the grain trade of the lakes is coming to Buffalo heavier than ever. During the past twelve days the eighteen working elevators in this harbor have handled 12,000,000 bushels of grain.

Instead of being diverted to other ports, the grain trade of the lakes is coming to Buffalo heavier than ever. During the past twelve days the eighteen working elevators in this harbor have handled 12,000,000 bushels of grain, an average of 1,000,000 bushels per day. Since the opening of navigation the amount received exceeds that for the same time last year by 4,000,000 bushels. This, too, in a year when the Duluth wheat shipments are far below the average.

It is announced that Capt. Louis Lautenslager had resigned his position as manager at this port of the Great Lakes Towing & Wrecking Co., to take effect this week. Capt. Wm. H. Hill, inspector for the company, is here to take charge until another manager is appointed. Capt. Louis Lautenslager has been in the tug business here for twenty-two years and has made for himself a reputation for giving the vessel trade at this port quick and effective service. He intends to take a short holiday.

A grain blockade is threatened again. All the elevators are pretty well filled up except the Bennett and Wilkeson, which are dependent on the Lackawanna for connection. Some of the larger grain cargoes have been here two days and will be here two days more before they can be unloaded. There is no saying how long this will last, for it all is a matter of cars. The fact that there is less elevator capacity than there was last fall has something to do with the difficulty, but not much. Any elevator soon fills up after the cars give out. The Erie cars gave out first.

We are practically out of the market for tonnage at Buffalo. The coal situation is apparently at its worst. There has been a temporary opening of the Lackawanna trestle. Coxe Bros. still get coal in considerable quantity, but all the others are doing comparatively nothing and will not show any improvement until the mines open again. There is some local coal business still, but it is growing less every day. The increased demand for soft coal has created such a general shortage that practically none can be spared for water shipment, and only about one cargo has gone forward since the strike. Erie has shipped considerable coal of late, and is now showing the shortage that exists here.

Brown & Co., Buffalo vessel agents, have received inquiries from many of their patrons, inquiring about the Atlantic coast trade, and particularly about the Canadian regulations governing the sailing of vessels of foreign register through the canals and waterways of the St. Lawrence route to the ocean. Charges on vessels going through the canals are reasonable. It costs about $71 in pilotage and canal fees to take through a vessel of 2,000 measured tons. The rate is 2½ cents a measured ton, and a pilotage fee of $1.50 a foot draught. Owners are holding for $2.25 from the head of Lake Superior and they are confident that the advance will be paid before the close of the week. Charters have been made from Lake Huron ports at $1.75.

Vesselmen and grain receivers have asked the common council to take some action to remedy the shoals, which deep laden boats are striking opposite the Watson elevator. Much trouble has been experienced from numerous groundings in Buffalo harbor, abreast the Watson elevator. The Mariposo of the Minnesota Steamship Company's fleet, the steamer Sir Henry Bessemer of the Rockefeller fleet and numerous other vessels within the past two weeks have been seriously damaged and delayed. On Friday last at a meeting of the Harbor and Canal Commitee of the Buffalo Merchants' Exchange the matter was also taken under consideration and resolutions adopted calling upon the Mayor and Common Council to take action looking to the remedying of the trouble. Capt. J. J. H. Brown and E. T. Evans were appointed a special committee to present the action of the Merchants' Exchange committee to the municipal authorities. In the resolution it was stated as the belief of the Canal and Harbor Committee that the work should be begun as promply as possible and sufficient improvment made to make the depth of water at the Watson elevator that in the remainder of the channel. No doubt was held by the committee that unless such steps were taken promptly Buffalo will suffer material loss of iron ore business which would otherwise come here and also some loss of its grain trade.

DULUTH—SUPERIOR.

Special Correspondence to The Marine Record.

During September the shipments from Ashland included 440,396 tons of iron ore and 14,830,000 feet of lumber.

The shaft houses at the Duluth mine on the Mesaba range were wrecked Saturday by the wind, and that mine will not be able to send forward any more ore this season. A number of vessels that would be supplied with contract ore during the next week will now be forced on the market for wild cargoes.

Capt. Joseph Kidd, the vessel surveyor, has gone to Blanchard Island, near Black Bay, about 100 miles northeast of Port Arthur, to investigate the wreck of the Canadian steamer St. Andrew. The St. Andrew was owned by the firm of Playfair & Co., of Midland, and was reported wrecked about September 20. It is said that a part of the wreck is visible, and Capt. Kidd will investigate and report for the underwriters.

Capt. Jos. Kidd has returned from Port Arthur. He went to Gull Island, opposite Blanchard Island, about 15 miles east of Port Arthur, to investigate the wreck of the Canadian steamer St. Andrews. He says the boat appears to be a total loss. She lies in ten fathoms of water and her upper works are gone. The point at which the vessel went down is exposed and Capt. Kidd says it would not be a favorable place for wrecking operations.

The passenger steamer City of Parry Sound was totally destroyed by fire on Tuesday at Collingwood. The steamer had arrived from Sault Ste. Marie, and most of her cargo had been removed. The fire started in the boiler room and was soon beyond control. When it was seen the vessel could not be saved, the burning hulk was towed out into the bay, where the fire completed its work. The steamer was valued at $30,000, and was insured for $15,000.

The report of the business transacted at the Port of Superior in September, has been prepared. The number of arrivals and clearances is considerably less than in August, as would be expected. The amount of anthracite coal received was several hundred tons ahead of last month, but bituminous coal fell off, this month's receipts being 164,227; those of last month were 216,621. The shipments of lumber in September exceeded those of August by about 3,000,000 feet. In August 241,000 tons of ore were shipped as against 188,706 tons in September.

The U. S. S. Picket of the United States Engineer fleet at Duluth, with J. H. Darling, Assistant Engineer, and M. W. Lewis, of Maj. C. B. Sears' corps, as surveyors, returned Wednesday morning, October 3d, from a trip to Stannard's Rock light-house, Lake Superior, where they located a small shoal about ¾ mile about west-southwest of the light-house. On the way back to Duluth, the party extended soundings to deep water on the shoal to the northeast of Rocky Island of the Apostle group. Some rough weather was experienced. The steamer was in command of Capt. Clell. D. Hibbard, of Duluth.

The receipts and shipments of the Duluth harbor, as taken from the records of the customs office, show an increase in the total tonnage shipped compared with the same month last year, although there is a heavy falling off in most of the items. Wheat shipments, for instance, fell nearly 1,700,000 bushels for the month; in flax and flour there was an increase. There were 382,955 barrels of flour shipped in September this year, compared with 264,015 barrels a year ago; the increase in flax was about 50,000 bushels. The difference in the quantity of lumber shipped was about 3,500,000 feet in favor of September, 1899. In iron ore, however, the shipments largely exceeded that of September last year, as, in fact, has every month of the year, notwithstanding the tie-up of the big Rockefeller fleet. The figures are 449,364 tons this year, compared with 355,953 tons last September. The total tonnage for the month was 602,668 tons, compared with 572,701 tons for the corresponding period in '99. The only feature of the receipts was the falling off from September of last year of about 5,500 tons of coal. There was also a general decrease in other receipts, making the total deficit for the month over 11,000 tons.

DETROIT.

Special Correspondence to the Marine Record.

The steamer Waccamaw, which is bound for the coast, passed Port Colborne on Tuesday. She was built at Craig's yard at Toledo.

Secretary Barter, of the International Longshoremen, has been called to Erie to settle differences over the change in the ore handling schedule.

It is reported that the Jenks Ship Building Co., of Port Huron, has decided upon the construction of two more steel vessels in addition to the one now under way, the keel for which was laid a week ago. Work on the other two is to begin early next spring.

Work in removing the wreck of the schooner Fontana from the channel by government contract began on Monday and will be pushed as fast as possible. The tug Columbia and dredge Gladiator arrived at the scene of the wreck and are now working on her.

It is quite possible it was the Rockefeller steamer Siemens that collided with the steamer Swallow near Marine City, Friday morning. It is now believed that the Swallow, which sank as the result of the collision, will be a total loss. The deck load of shingles and cedar posts is being taken off the wreck.

Assuming that the lake iron ore shipments during October are no bigger than in September—and it is said they probably will be more—the total on Nov. 1 will be about 18,500,000 tons, leaving only 1,500,000 tons to be shipped in the last month of the season to make the lake movement 20,000,000 tons, independent of rail shipments.

Capt. Miles Barry says that the sale of the steamer M. Bradshaw to W. H. Singer, of Duluth, has not yet been consummated, owing to a difference in regard to the price. He expects to have the matter settled within a day or two one way or the other. His price for the steamer is $ the offer made for the craft is somewhat under that

The schooner Mineral State, an old but a stanch craft which holds to the old-fashioned way of traveling with canvass, is being overhauled in the Detroit drydock. The schooner carries scrap iron for the Calumet & Hecla Co. between Lake Linden and Detroit, and is equipped with a complete outfit for handling cargo with all the despatch of larger craft.

A handsome mahoghany steam launch was unloaded from a flat-car in the Detroit drydock slip and was turned over to Col. B. Lothrop, her new owner. The launch is the Palos, built in Bristol, R. I., six years ago, for Robert E. Todd, of New York. It is said that she will easily make 15 miles an hour, and will show her heels to many of Detroit's more pretentious launches.

The Eureka, one of the Hawgood boats, which is to go to salt water this fall, is at Hodges Iron Works this week having her cylinder rebored and reduced. The Eureka and Tampica have both about completed their ore contracts and will go through the canals as soon as the last pound of ore is unloaded. Both were built for salt water service with completely protected machinery, surface condensers, etc. Capt. Fred Ahlstrom and Chief Engineer Oldman will both go with the Eureka to the coast, and Capt. Ahlstrom is busy studying salt water charts ready for his new duty.

CHICAGO.

Special Correspondence to The Marine Record.

Freights are by no means what they ought to be, on Tuesday the quoted rate was 1⅝ cents on corn to Lake Erie.

The sale of the steamer Ravenscraig by the Wilson Transit Co., to R. J. Dunham and others, of Chicago, was announced as consummated on Monday. The price is given at $145,000. She will be turned over to her new owners on January 1st.

The steamer S. J. Murphy left on Tuesday from the McReynolds elevator at South Chicago, with 270,000 bushels of corn, the largest cargo ever shipped from Chicago. It was equal to 7,560 net tons. The next largest cargo was taken last season by the steamer Superior City, of the American Steel & Wire Co.'s fleet, and was 7,463 tons.

A Chicago firm of bituminous coal mine owners has closed a contract for 500,000 tons of bituminous coal from this country for use in England. The British consumers have undertaken to conduct its transportation from this country in their own vessels. It is stated that the coal is intended for use on British railways and in British steamships.

The movement of lumber is about as it has been, the shippers taking all of the boats that are offered, but the rates not changing to any degree. The competition between the lake and the all-rail lines is still strong. The movement of grain from the head of the lakes is light, but the rates out of Chicago have not changed, no further effort being made to break them.

Capt. S. R. Chamberlain, owner of the steamer H. L. Worthington and consorts, and former member of the firm of Higgie & Chamberlain, No. 4 Rialto building, which dissolved, and G. C. Blair, successor of the firm of H. W. Cook & Co., have formed a co-partnership to conduct a vessel and insurance agency under the firm name of S. R. Chamberlain & Co., located at Room 13, 6 Sherman street.

The Wisconsin Central Railroad bridge in the south branch of the river was, last Monday, the scene of another bad vessel blockade. The schooner Amazon, bound up the south branch without cargo for a load of grain, was caught between the railroad bridge and the pier of the structure at Taylor street, and could not be moved by tugs in either way. Finally a hawser was taken to the Western liner Chicago, which was moored near, two tugs were at the bow, which pointed to the north, and another hawser was taken to the dock and applied to the vessel's steam winch. After half an hour of pulling by the combined forces the Amazon was forced back into the channel, and the railroad men closed their bridge, thankful to have escaped with half an hour's blockade instead of nearly a day, as was the case when the steamer S. S. Curry was jammed in the same place. The vesselmen found that the cause of the jam was the cofferdam built at the abutment of the new railroad bridge by the drainage board enginers. When the Curry was struck a corner was taken off this cofferdam, but it had been partly built in again, and the Amazon did not have room to pass, even without a cargo. She has been towed past the same place several times in the past. Dredges were sent for and at once began tearing out the piles. It was thought the Amazon would be towed to her elevator before morning. The whaleback steamer Frank Rockefeller, of the Bessemer line, came in after the Amazon's jam, and was stopped near the mouth of the river by her agents until the channel should be cleared.

CATCHING THE ALBATROSS.

By the time that we had approached Tristan da Cunha three or four species of albatross had congregated round the ship, as many as thirty birds settling on the water astern in a manner highly satisfactory for close and continuous observation. After half a gale of wind a lull not infrequently occurs, when the speed is reduced to two or three knots; then the hungry creatures literally clamor for food. Directly a bird intends to alight the legs appear straddling downward in a clumsy fashion—a moment when even an albatross looks like an ill-balanced goose of unwieldy size. For half a minute it runs along the surface of the waves, treading the water, so to speak, until the enormous wings become manageable. Then the bird swims with both wings thrown back like a pair of lateen sails, a very argonaut on the translucent sea. At length the difficulty is overcome, the wings are packed away, and—like a large gull— it rides the waves with consummate ease. Sometimes it padles to and fro, or, again, it dives gracefully beneath the surface after squids or similar ocean dainties. Half a dozen birds, perhaps, gravely assemble to inspect an empty beer bottle thrown overboard, to bob up and down idly on the waves, and inquisitive bills peck vigorously at the unsatisfactory flotsam, until a battle royal disperses the family party. The wiser ones meanwhile hover in mid-air, craning their necks to throw penetrating glances from a superior height.

With the birds setting by the dozen, it is easy enough to capture specimens for examination without causing injury or pain. Any sharply barbed hook is altogether superfluous. The albatrosses absolutely enjoy the excitement, and the sport obtained is not without novel interest. A small metal frame should be made in the shape of a hollow triangle, attached to 100 yards of stout line, and kept afloat by a good-sized piece of cork. The sides of the metal frame are then covered with bits of fat pork, the hard skin of which is securely bound thereto; the bait is thrown astern, and the line slowly paid out. Presently a great albatross swoops through the air, impelled by curiousity to investigate the nature of the floating cork. It settles before the dainty morsel of food, numbers of birds follow suit, each one made bold by competition, and then the sport begins. At this moment additional line must be given in order to compensate for the progression of the ship, thus enabling the bird to seize the desired food. With a sudden rush the supreme effort is made. Once or twice the attempt proves ineffectual, but, rendered bold by greediness, a final grab finds the curved bill securly wedged inside the apex of the triangle, as the fierce tugs on the line quickly indicate. Steadily the haul is made hand over hand, until a helpless albatross is bodily lifted on to the poop in an absolutely uninjured condition. A slackened line enables the bird to escape, and if scattered wits permitted such an effort, sudden flight would also obtain release. The other birds invariably commence to attack a captured comrade, a steady pull being required, even if the line does cut your hands, to save it from its friends.

Once safely on deck, the mandibles are tied together, for otherwise the bird throws up an oily fluid, a disagreeable habit possessed by all the tribe. Subject to this precaution, it may wander gravely around to survey the new horizon of life. The large eyes gaze with a truly pathetic confidence, expressive of anything but fear. It is a strange spectacle to witness the inquisitive bird solemnly waddle to and fro among the equally inquisitive human beings around. True, it objects slightly to the process of measurement, pecking sharply by way of protest, but a gentle box on the ear soon induces submission as the dimensions are rapidly noted, the albatross meanwhile reposing affectionately in the arms of the second officer. The specimen happens to be a small one, but the wing expansion from tip to tip is no less than 10 feet; the extreme length of body is 3 feet 6 inches, and the formidable bill measures upward of 4 inches. Everything about the great wandering albatross (D exulans) is vast—the wings are enormous; the flight is reckoned by the thousand miles, and its very nest may be found within the extinct crater on the adjacent island of Tristan da Cunha—7,000 feet above the sea level. The plumage varies greatly on different specimens and at different seasons; young ones, like our friend under observation, having a mottled brown appearance. The bill has a rosy tinge at the base of the mandibles, passing into horn color at the tip of the curve of the culmen. The head, neck and body, together with the breasts, are principally white; the mantle has beautiful pencilings of black. The wings are brown above and white underneath, tipped above and below with black—an invariable character of the green albatross. The tail is chiefly white, relieved by blotches of black, which give the appearance of a black bar edging the white coverts. The legs, feet and toes have a peculiar bluish gray, with a suspicion of a livid pinkish hue somewhat difficult to define. The black pupils are bordered with green.

I found 11 feet 6 inches to be the average wing measurement, although a gigantic specimen in the Sydney museum extends 17 feet 6 inches with a bill 6 inches long. All sailors are familiar with the great wandering albatross in its varying plumage. While the young and even second-year birds possess every variety of brown coloration, the real mature specimens—especially round the Horn—are nearly pure white, with the black tips above and below. Most of the other species are hopelessly confused by sailors under the general term "mollymauk" (a word spelled in divers ways), and it took me many weeks to distinguish the different kinds.—Cornhill Magazine.

NOTICE TO MARINERS.

LIGHT-HOUSE ESTABLISHMENT,
OFFICE OF THE LIGHT-HOUSE INSPECTOR, 11TH DIST.,
DETROIT, MICH., October 9, 1900.

Notice is hereby given that the experimental gas and bell buoy recently placed at the St. Clair Flats canal, lower entrance (west side) has been replaced by the regular gas buoy known as No. 163 in the List of Lights and Fog Signals, Northern Lakes and Rivers for 1900.

The experimental gas and bell buoy has been discontinued.

By authority of the Light-House Board.

J. C. WILSON, Commander U. S. N.
Inspector 11th Light-House District.

FLOTSAM, JETSAM AND LAGAN.

The new tonnage put into the water by Scottish builders last month makes, with one exception, the best August output for more than ten years past. The figures were 38,185 tons, against 41,350 tons in the corresponding month of last year. The next best August was that of 1895, when the new tonnage lauched amounted to 37,104 tons.

The coal sheds of the Sheboygan Coal Co., suffered a loss by fire on Tuesday morning of $7,000. The schooner Board of Trade, with hardcoal from Buffalo consigned to the concern, arrived after the fire and was taken by the Reis Coal Co. No more coal can be received this season by the Sheboygan Coal Co. The loss is partly covered by insurance.

The National Steel Co., will ship this week to New Zealand 1,000 tons of steel rails. This is one of the most important steel rail export orders that has ever been signed. It marks the opening of a new market for steel rails. The shipment will be made in one solid train of 40 cars. The trains will be made up at Youngtown, Ohio, where the rail mill is located.

The Newport News Ship Building & Dry Dock Co., has been awarded the contract by the North German Lloyd Co., for rebuilding the large steamship Main, recently burned in the disastrous dock conflagration at Hoboken. The contract involves between $600,000 and $700,000, and is the largest repair contract ever taken by this yard. The original cost of the ship was $1,500,000. The Main goes to Newport News this week, and it will be about a year before she will be ready to take her place in the line.

The New York Ship Building Co., of Camden, has begun to punch plates for its first ship, and will within a few days lay its first keel. The contract for this ship of the company was made with M. S. Dollarand & Co., of San Francisco. A company is now forming to operate between San Francisco and Honolulu, and this will be the first of its fleet. The new ship will be built for the freight trade distinctively. Her length will be 300 feet. Dollarand & Co., also plan to have built in the Camden yard a larger ship for the Honolulu trade.

In consequence of the blocking of the channel of the Shiawasse river 50,000 acres of land in the southern part of Saginaw county are rendered valueless. The river overflows into other channels, the surrounding country is flooded and remains wet until the summer is well advanced, rendering the land useless for agricultural purposes. In 1897 the legislature appropriated 5,000 acres of the land in Otsego and Cheboygan counties for the purpose of clearing the channel of this stream. The state board of control, on September 26 last, restored the lands set aside for the clearing of the channel of this stream to market and discontinued further action in the matter of the improvement of the stream.

That feature of the Ann Arbor report which indicates a phenomenal growth of the car ferry business is of more than ordinary interest to Toledo. The Ann Arbor is pioneer in trans-Lake Michigan business, and that it should prove to be profitable is an assurance that the Michigan lines will continue to their car ferry routes. The advocates of the Lake Michigan car ferry routes have insisted that business from the Northwest to Eastern points can be handled more satisfactorily across the lake then by the Chicago route. It has been proved that better time can be made for freight on the car ferry route than by switching through Chicago, but that such traffic is profitable to the car ferry lines has been, in the opinion of some railway managers, a debatable question. The Ann Arbor's report is looked upon by the car ferry advocates as a substantial victory.

CLEVELAND.

Special Correspondence to The Marine Record.

Capt. J. J. H. Brown, the well known vessel manager of Buffalo, was in the city Wednesday.

On her first trip the steamer Capt. Thos. Wilson took 6,282 tons of ore from Ashland to South Chicago on a little less than eighteen feet.

Papers were filed in the office of the collector of customs on Tuesday by which J. H. Reed, of Ashtabula, qualified as master of the steamer Matoa, of the fleet of the Minnesota Steamship Co.

Mr. Loftus Cuddy, formerly of the Cuddy-Mullen Coal Co., of Cleveland, says that the shipbuilding ports on the great American lakes are gradually supplying the United States with a much needed merchant marine.

The ore contract season closes the last day of this month, and there is noted a big rush on the part of the owners to get as much ore down the lakes as possible. It is altogether probable this will be the banner ore month of the season, and for all time past.

The freight market is quiet all around and no changes were made in carrying charges. No ore charters have been reported for several days and the coal shippers are taking very little wild tonnage. The leading dealers are still complaining about the shortage of cars and in some cases shippers have about all they can do to take care of their contract vessels.

On Tuesday morning the officers of the Great Lakes Towing Co., received word from Astabula that the little steamer Beta of the Cleveland Canal Steamboat Co., was disabled off that port, her machinery evidently having gone back on her. She was headed for this port from Buffalo light. The tug Stone was sent to her assistance and towed her into this port It was found that her engine had broken down.

In the office of the engineer of rivers and harbors, Col Jared A. Smith, Corps of Engineers, U. S. A., on Tuesday opened bids for the improvement work that is to be done on the harbor of Lorain. The work bid upon is the erection of a new west breakwater, the tearing down and rebuilding parts of the east and west piers and building two pier heads. The figures will be given out as soon as they are placed in order for that purpose.

The ore movement is without change, but few if any wild charters being made. Most of the vesselmen who have contracts to carry a speciffed amount of ore are either ahead or even with their contracts, while those who have their boats chartered to the limit of their capacity until the 1st of November are rushing to get as many trips in possible. If a boat get away from the shipping port before the end of October her cargo is carried under the contracts.

LETTERS AT DETROIT MARINE POST OFFICE.

October 10, 1900.

To get any of these letters, addressees or their authorized agents will apply at the general delivery window or write to the postmaster at Detroit, calling for "advertised" matter, giving the date of this list and paying one cent.

Advertised matter is previously held one week awaiting delivery. It is held two weeks before it goes to the Dead Letter Office at Washington, D. C.

Ames, D. T., Str. Marshall
Bennett, Ray D., Str. Monkhaven
Baker, Henry, Str. Superior City
Brahmear, John, Str. E. Smith
Bobeck, John
Bacon, Mrs. Retta, 2, Sch. J. Martin
Brown, H. N.
Brisk, John, 3, Str. Pasadena
Babcock, Geo. F., Str. Pioneer
Brown, D. T., Str. Lyons
Baker, Clue, Str. Rensselaer
Berentsen, Capt. Jacob, Str. Reitz
Bostwick, Murray, Str. W. P. Palmer.
Crafford, Chas.
Carroll, P. J., Str. Waverly
Cadotte, Henry
Dingwell, J.
Elsey, Walter, 4, Str. Hennepin
Flanigan, A. L., Str. Siemens
Fay, Harry
Ginac, Wm., Str. E. A. Shores
Griffin, Gus
Gillmore, O. H.
Gustin, Mrs. W. H., Str. Eureka
Griffly, Fred, Str. Admiral
Haywood, Heo., Str. Eads
Hanna, Septinus, Str. Spokane
Hartman, J. A.
Horton, A.
Hoffman, Mrs. Catherine, 2
Jackson, Daniel, Str. T. Wilson
Keinsberg, Wm. Str. Presque Isle
Lapham, Guy, Str. Hennepin
Lavely, Peter, Str. Fritz
Marsden, Willie, 2, Str. St. Paul
Manning, E. A., 2, Str. Angeline
Marshall, Fred, Str. Rust
Morrison, W. A., Str. Pope
Morgan, Harry J., Str. Bielman
Moulthorp, Mrs. Guy H., Str. Eureka
Mead, Mrs. Wm.
McDonald, Eddie, Str. Nyanza
McDonald, Jerry, Str. E. A. Shores
McDonald, Peter, Str. Watt
McKelvey, G. A., Str. Eureka
McMillan, Dan B., Str. Kaliyuga
McGaw, Wm. A., Str. City of Cleveland
McIntyre, Duncan
McCarthy, John, Str. J. B. Lyon
McLean, Will
Nelson, Fremont E., Str. 131
Plunkett, Laurence, Str. Lilly May
Rickerd, O. L., 2, Str. Waverly
Raby, George, Str. Sage
Ryan, John, Str. Ravenscraig
Slattery, Stephen, Str. Curry
Smith, W. H., Str. Josie
Sprague, Mrs. Ezra H.
Schrig, John, Str. Rensselau
Smith, Robert, Str. Lockwood
Williams, Jno. E., Str. Waverly
Whitney, F. C., Yacht Sylvia
Wallis, R. A., Str. Roby
Wheeler, Edith A.
Wilson, A. H., Str. Shrigley

F. B. DICKERSON, P. M.

THE RELATIVE CORROSION OF WROUGHT IRON, SOFT STEEL AND NICKEL STEEL.*

BY HENRY M. HOWE.

This paper, of which the present as an abstract, gives the loss of weight by oxidation of many plates of wrought-iron, soft steel and nickel steel of 3 per cent. nickel and of 25 per cent. of nickel, when exposed to sea water, to river water, and to the weather for two periods of about one year each. Each plate was about 24 inches long, 16 inches wide, and one-eighth of an inch thick. The total weight of all the plates was 2,597 pounds, and the total area exposed was 928 square feet. Thus the scale of the experiments was not only much larger than that of any previous experiments of which I know, but larger, I believe, than that of previous experiments taken collectively. The paper also tabulates and compares the results of all other accessible and respectable investigations into this subject.

The general results are as follows:

Wrought iron compared with soft steel. There is, at least in the United States, a strong and widespread belief that soft steel corrodes much more rapidly than wrought iron; and this belief has greatly retarded the introduction of soft steel for tubes for various purposes for which oxidation is a matter of vital importance. To this question, then, great attention was paid.

We, of course, recognize a reasonably constant difference in tendency to oxidize, not only between metals much apart in their chemical properties, like sodium and platinum, but even between those which are far more nearly alike. We do not hesitate to say that manganese oxidizes more readily than iron, and iron more readily than copper.

Between wrought iron and soft steel such a difference might exist, and there are many who suppose that it does exist that soft steel as a whole oxidizes more rapidly than wrought iron, just as iron oxidizes more readily than copper. But, while a difference of this kind might exist, I find no evidence in the data thus far collected that it does exist. I do not thus find that wrought iron as a whole corrodes more than soft steel as a whole, nor do I find the reverse to be true. Taking all common classes of wrought iron and of soft steel together, and all conditions of exposure to oxidation to which engineering structures are commonly exposed, except, perhaps, in marine boilers, I find it extremely difficult to say that either wrought iron or soft steel as a class on the whole excels the other in resistance to oxidation. But, while we find no marked difference between these two classes of iron taken as a whole, we often find moderate and somewhat constant differences in certain specific cases, and we sometimes find great differences. Thus in my own experiments soft steel corroded less than wrought iron in fresh water, but more than wrought iron in sea water; and the difference, though always moderate, was in each case sufficiently constant to raise a considerable presumption that it was a real and not merely an apparent one. But, though soft steel in sea water thus corroded more than wrought iron in my experiments, it corroded much less than the wrought iron in Krupp's very important experiments; and here, too, the difference was so constant as to raise a considerable presumption that it is real, and not merely apparent. And so on with other sets of experiments.

The inference which I have drawn is as follows:

1. That the difference in the rate of corrosion between wrought iron and soft steel is rarely enough to be of great moment except, perhaps, in marine boilers.

2. That the ratio of the corrosion of given soft steel to that of given wrought iron may vary greatly with the conditions of exposure.

Of the apparent discrepancies between the results not only of different observers, but even of the same observers, I suggest two chief causes.

1. The quasi-accidental variations, individual peculiarities, etc.

2. That the susceptibility to corrosion of soft steel, taken as a whole, does differ somewhat from that of wrought iron, taken as a whole; but that this difference is of such a nature that wrought iron as a class corrodes on an average faster than soft steel under certain conditions, but slower than soft steel under others.

But, we may ask, What are the differences in composition or constitution between wrought iron and soft steel, which are capable of producing a difference in susceptibility to oxidation, which difference itself is liable to change not only in intensity but even in sign?

*Abstract of paper read at the International Congress on "Methods of Testing the Materials of Construction."

Apart from the fact that wrought iron usually contains less manganese but more phosphorus than soft steel, we have two important differences; wrought iron contains a considerable quantity of "conder" or "scale" in flakes or sheets mechanically intermixed with the pure iron or ferrite; soft steel, while lacking this, has usually considerable more carbon than wrought iron. This carbon exists in the form of the definite carbide, Fe 3 C, called cementite, of which there are 15 parts by weight for every part of carbon present; so that for every 0.10 per cent. of carbon there is 1.5 per cent. of cementite. This cementite lies in microscopic flakes. It is, indeed, present in both wrought iron and soft steel, but the latter has usually so much more cementite than wrought iron has, that the excess of its cementite is of about the same order of importance as the excess of the flakes or "cinder" or "scale" in the wrought iron.

Each of these substances, cinder and cementite, should have a two-fold influence. First, as each resists oxidation powerfully, each should, like so much paint, mechanically protect the particles of the pure iron or ferrite underlying it; second, each by difference of potential should retard or hasten the corrosion of the iron, as the case may be. Let us distinctly recognize this two-fold influence of these two substances, the cinder of wrought iron, and the cementite present in relative excess in soft steel; first, mechanically protective; second, by difference of potential, perhaps hastening, perhaps retarding, the oxidation of the underlying metallic iron. It is possible that this line of thought is new.

The resultant of these two influences should vary with the nature of attacking medium, whether this be fresh water, sea water, acid or alkaline liquor; and it should also vary with the progress of the corrosion.

When a piece of wrought iron or steel is first exposed to oxidation, it is only what we may call the outcropping edges of the sheets of cinder or of cementite which mechanically protect the underlying pure iron from oxidation. Those parts of the pure iron which lie originally at the surface, without overlying sheets of cementite or cinder, receive no mechanical protection. But as the oxidation proceeds and these outcropping parts of the pure iron are gradually dissolved away, more and more of the cinder or cementite becomes exposed and thereby prevents the air or water from reaching and attacking the underlying pure iron or ferrite. Thus, in short, the mechanical protection of the flakes both of the cinder of wrought iron and of the cementite of soft steel should increase as oxidation proceeds; but the protection of the cinder need not increase in the same ratio as that of the cementite. It might well be that, since the cinder is distributed in the wrought iron in a manner very different from that of the cementite in soft steel, with the progress of oxidation and with the gradual removal of the outcropping pure iron, the mechanical protection of the cinder of wrought iron should increase much more than that of the cementite of soft steel. Hence, it is quite possible that though wrought iron and soft steel should corrode at the same rate initially, yet later (the oxidation of the wrought iron being retarded by the increased protection of its cinder more than the oxidation of the steel is retarded), the wrought iron should oxidize much less than the steel.

Knowing that there was a widespread belief that wrought iron oxidixes less than soft steel, and yet having before me the results of such extensive direct experiments which indicate that it does not, it occurred to me that the discrepancy might be explained in some such way as I have here outlined; for our direct experiments usually last a relatively short while, and represent rather the initial rate of oxidation than the latter rate; whereas, the opinions of industrial users of wrought iron and steel based on the results of industrial use, would represent longer trials, usually carried on to destruction.

Fortunately data for testing this hypothsis were at hand; for in my own experiments and in another very extensive series, the oxidation of soft steel and of wrought iron for each of two successive long periods was given. Comparing these, I do not find that the oxidation of soft steel accelerates relatively to that of wrought iron as the period of exposure continues.

Therefore, this reason for questioning the results of our direct experiments is weakened. But in view of it, all of my plates are still under exposure, and I hope to reweigh and report on them again after a further period of several years.

As to the influence of difference of potential of the cinder of wrought iron and the cementite of soft steel, I have carried out a long series of direct experiments with various liquors. It would carry us too far even to outline the results of these here.

The following table sums up the results of my own experiments:

RELATIVE CORROSION OF SOFT STEEL, WROUGHT IRON AND NICKEL STEEL, TAKING WROUGHT IRON AS A STANDARD.

	Sea Water.	Fresh Water.	Weather.	Average.
Wrought iron	100	100	100	100
Soft steel	114	94	103	103
3 per cent. nickel steel	83	80	67	77
26 per cent. nickel steel	32	32	30	31

Nickel steel, both of 3 and 26 per cent. of nickel corroded under all conditions less than either wrought iron or steel, as was to be expected. The difference, however, was much less than might have been hoped. On a general average the 3 per cent. nickel steel corroded 77 per cent. as fast as the wrought iron, and the 26 per cent. nickel steel about one-third as fast as the wrought iron. The superiority of the 3 per cent. nickel steel in this respect, thought decided, is hardly enough to weigh heavily in determining its production. The 26 per cent. nickel steel, while it certainly has an enormous advantage over common soft steel and wrought iron as regards corrosion, yet probably is at a great disadvantage in this respect when compared with some of the copper alloys with which it will have to compete. We cannot call it a non-corroding metal under common conditions, it is simply a slowly corroding one.

TIDAL WAVES.

What of the tidal wave, that mysterious indispensable swelling of the waves that, following the "pull" of the moon, rolls round this globe of ours twice in each 24 hours, stemming the outflow of mighty rivers, penetrating far inland wherever access is available, and doing within its short lease of life an amount of beneficent work freely that would beggar the wealthiest monarchy of the world to undertake if it must needs be paid for? Mysterious it may well be called, since, tho its passage from zone to zone be so swift, it is, like all other waves, but an undulatory movement of that portion of the sea momentarily influenced by the suasion of the planet—not, as is vulgarly supposed, the same mass of water vehemently carried onward for thousands of miles.

To meet a tidal wave at sea is in some parts of the world a grim and unforgettable experience. Floating upon the shining blue plain, with an indolent swelling of the surface just giving a cozy roll to your ship now and then, you suddenly see in the distance a ridge, a knoll of water that advances vast, silent, menacing. Nearer and nearer it comes, rearing its apparently endless curve higher and higher. There is no place to flee from before its face. Neither is there much suspense, for its pace is swift altho it appears so deliberate from the illimitable grandeur of its extent. It is upon the ship. She behaves in accordance with the way she has been caught, and her innate peculiarities. In any case, whatever her bulk, she is hurled forward, upward, backward, downward, as if never again could she regain an even keel, while her crew cling desperately to whatever holding place they may have reached.

Some will have it that these marvelous upliftings of the sea bosom are not tidal waves at all—that they do not belong to that normal ebb and flow of the ocean that owns the sway of the moon. If so they would be met with more frequently than they are at sea, and far more disasters would be placed to their account. This contention seems reasonable because it is well known that lonely islets such as St. Helena, Tristan d'Acunha and Ascension are visited at irregular intervals by a succession of appalling waves (rollers) that deal havoc among the smaller shipping and look as if they would overwhelm the land. The suggestion is that these stupendous waves are due to cosmic disturbance, to submarine earthquakes upheaving the ocean bed and causing so vast a displacement of the ocean that its undulations extend for several thousands of miles.—London Spectator.

NAVAL expansion is the order of the day. A study of the budgets of the various naval powers, the building programs as outlined therein, and the constantly increasing amounts devoted to new construction, all serve to indicate the serious attention given to the subject of naval increase. England, as usual, leads with the lagest sum for the support and increase of her navy. But large as is this total, it is generally felt that the admiralty program is inadequate, and the press of that country is actively urging a further increase.

LATITUDE AND LONGITUDE BY THE GREATEST ALTITUDE, AND BY EQUAL ALTITUDES OF A HEAVENLY BODY.

During the last two centuries vessels have been groping their way in the dark on the trackless ocean on account of defective, officially approved astronomical methods, and in many instances it is a wonder that they escaped stranding despite gross errors in their reckonings. Depending for latitude principally on meridian altitudes, the speed of vessels and the change of the declination of the observed objects affecting altitudes, and consequently also latitudes, have never been taken into account, causing errors in position which have brought many a vessel to grief.

Latitude is an indispensable factor in the solution of every nautical-astronomical problem. With the latitude in error, the results of all reckonings for time, longitude, the variation and deviation of the compass, etc., are also in error. The magnitude of these errors influencing position has never been ascertained, so that it justly may be said vessels have been groping their way in the dark.

The change of position and the change of the declination during observations affect altitudes on and near the meridian sometimes considerably, for which no allowance is made by the methods in use. Neither is the difficulty of noting the time for such altitudes taken into account. In observing altitudes near the meridian and noting the time by a watch, the nearer the meridian, the more indistinct becomes the time pertaining to a certain altitude, the change of altitude in one minute of time becoming so small as hardly to be noticeable in the instrument. Therefore, in observations for time, altitudes should be so far from the meridian that their change in one minute of time is easily perceptible.

Furthermore, as altitudes over the sea horizon are liable to an error of at least one minute, the change in altitude should be so large that an error of one minute in altitude has no great effect on the observed time. An error of one minute in altitude, when the change in altitude is only one minute in one minute of time, causes the latter to be one minute in error; a change of two minutes in altitude under the same conditions causes the time to be 30 seconds in error; a change of three minutes in altitude causes the time to be 20 seconds in error, and so on. Twenty seconds in time equal 5 minutes in longitude. Taking this to be the greatest allowable difference from the correct longitude in, the following table shows the least hour angles at which observations for time near the meridian should be made:

TABLE I.

Showing the hour angles in time at which altitudes change 3 minutes in 1 minute of time.

1	2		3		4		5	6		7		8	
Latitude Degrees.	Declination of different name from latitude.						Declination.	Declination of the same name as latitude.					
	30°		20°		10°		0°	10°		20°		30°	
	M.	S.	M.	S.	M.	S.	M. S.	M.	S.	M.	S.	M.	S.
10	34	40	24	48	16	12	8 4	0	0	8	36	18	24
20	43	24	33	28	24	48	16 40	8	36	0	0	9	48
30	53	24	43	24	34	40	26 32	18	24	9	48	0	0
40	65	52	55	40	46	52	38 40	30	28	21	48	12	0
50	82	52	72	32	63	32	55 30	46	52	38	8	28	12
60	110	0	99	8	89	44	81 4	72	32	63	32	53	24
70	167	56	153	56	143	8	133 20	123	48	113	52	102	52

The method to be considered farther on demands a restriction of hour angles to about one hour, so that a line drawn in the preceding table from 40 degrees of latitude in column 2 to 60 degrees of latitude in column 7 shows about the limit of observations, and also shows that only a small margin is left in some cases to carry out observations for time.

Within about one hour on each side of the meridian, the differences of altitudes with the meridian altitude, and the hour angles, follow the simple law of the co-ordinates of a parabola. For, the equation of the reduction to the meridian reads:

$$H-h=\frac{225\ t^2 \sin 1'}{2\ (\tan b \mp \tan c)}$$

in which H—h is expressed in arc minutes and t in time minutes; H denoting the meridian altitude, h the ex-meridian altitude, t its hour angle, b the latitude and c the declination.

Putting $\frac{225 \sin 1'}{2\ (\tan b \mp \tan c)} = \frac{1}{p}$

$$p = 30{,}558\ (\tan b \mp \tan c) \ldots\ldots\ldots\ldots\ldots (1)$$

and expressing H—h by y.

$$p\ y = t^2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

which is the co-ordination formula for the parabola, p being its parameter.

Changing the beginning of co-ordinates from the vertex to a point of the curve a minutes East for which $y = q$, formula (2) transforms into

$$y = q - \frac{(a-t)^2}{p}$$

and as $pq = a^2$ we obtain by substitution

$$y = \frac{t}{p}\ (2a - t) \ldots\ldots\ldots\ldots (3)$$

t denoting the time from the beginning of co-ordinates.

A change of position on the true course n at the rate of e miles per time minute, causes in t minutes a change in latitude and consequently in altitudes of $t\ e \cos n$, and in the hour angle a change of $\frac{te \sin n}{15 \cos b}$. On account of the change in latitude alone equation (2) transforms into

$$y = \frac{t}{p}(2a-t) \mp t\ e \cos n$$

$$= \frac{t}{p}(2a - t \mp pe \cos n)$$

upper sign when latitude increases, lower sign when latitude decreases.

A change in longitude alters the time so that

$$t = t \mp \frac{t, e \sin n}{15 \cos b} = t, \left\{1 \mp \frac{e \sin n}{15 \cos b}\right\}$$

upper sign for westerly, lower sign for easterly courses.

Putting

$$1 \mp \frac{e \sin n}{15 \cos b} = g \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

and writing t for t,

$$y = \frac{t\ g}{p}\left\{2a - t\ g \mp pe \cos n\right\} \ldots\ldots\ldots (5)$$

which is the general formula for the difference of altitudes near the meridian, with the altitude at the beginning of co-ordinates, on a change of position, from which a can be found, as y and t are known by observation.

For any two altitudes whose differences with the altitude at the beginning of co-ordinates are y, and y_2 and the respective time from the beginning of co-ordinates t, and t_2 we have the following expressions

$$y_1 = \frac{t_1\ g}{p}(2a - t,\ g \mp pe \cos n)$$

$$\text{and } y_2 = \frac{t_2\ g}{p}(2a - t_2\ g \mp pe \cos n)$$

from which is found

$$a = \tfrac{1}{2}\left[g\ (t_1 + t_2) + \frac{p}{g}\ \frac{y_2 - y_1}{t_2 - t_1} \mp pe \cos n\right]$$

For equal altitudes $y_2 - y_1 = 0$, therefore

$$a = g\ \frac{t_1 + t_2}{2} \mp \frac{pe \cos n}{2} \ldots\ldots\ldots\ldots (6)$$

By differentiation of formula (5) is found that y is a maximum for

$$t = \frac{2a \mp pe \cos n}{2g}$$

Denoting t for which y is a maximum by T, it follows that

$$a = g\ T \mp \frac{pe \cos n}{2} \ldots\ldots\ldots\ldots (7)$$

Comparing the last expression with (6) we find that $T = \frac{t_1 + t_2}{2}$, proving the symmetry of the curve, and the maximum ordinate to be in the center between t_1 and t_2. As this is true for all equal altitudes, T equals half the elapsed time between any two equal altitudes; the beginning of co-ordinates changing with the altitudes. This property of T renders it very easy of observation.

Substituting the value of a formula (7) in formula (5) the latter transforms into

$$y = \frac{t\ g_2}{p}\ (2T - t) \ldots\ldots\ldots\ldots (8)$$

which is the general formula for equal altitudes; y is a maximum when $t = T$ or when

$$y = \frac{(T\ g)^2}{p} \ldots\ldots\ldots\ldots (9)$$

Subtracting T from formula (7)

$$a - T = T\ (g - 1) \mp \frac{pe \cos n}{2}$$

or

$$a - T\ (g-1) = T \mp \frac{pe \cos n}{2}$$

$$\text{but as } g - 1 = \mp \frac{e \sin n}{15 \cos b}$$

$$a \mp \frac{T\ e \sin n}{15 \cos b} = T \mp \frac{pe \cos n}{2} \ldots\ldots\ldots\ldots (10)$$

As the left hand side of the equation represents for the time T, the abscissa of the changed meridian, $\mp \frac{pe \cos n}{2}$ is the correction of T to find the position of the changed meridian for the time indicated by T, and as T is counted from east to west, $T + \frac{pe \cos n}{2}$ remains on the east side of the changed meridian; therefore, counting the correction from the meridian, its sign has to be reversed into $\pm \frac{pe \cos n}{2}$—the minus sign then indicating an easterly, the plus sign a westerly hour angle, as is generally the case.

The reduction of the greatest altitude to the meridian is obtained by the usual formula $y = \frac{t^2}{p}$ in which t equals $\mp \frac{pe \cos n}{2}$, consequently the reduction

$$y = \frac{p\ (e \cos n)^2}{4} \ldots\ldots\ldots\ldots (11)$$

This correction is always to be added to the greatest altitude in order to obtain the meridian altitude, and from it in the usual way the latitude for the time or moment indicated by T,

The object will be on the meridian for the greatest altitude $\frac{pe \cos n}{2}$ minutes before or after the greatest altitude is observed. But as the meridian also changes place during that time at the rate of $\frac{1}{g}$, $\frac{pe \cos n}{2g}$ is the time required before or after the object is on the changed meridian, and the reduction in reference to the greatest altitude

$$y = \frac{g^2}{p}\left\{\frac{pe \cos n}{2g}\right\}^2 = \frac{p\ (e \cos n)^2}{4}$$

the same as the reduction of the greatest altitude to the meridian at the time T. The difference, however, is that this correction has to be subtracted from the greatest altitude in order to find the altitude at the object's transit, the real meridian altitude.

The hour angle of the greatest altitude in reference to the meridian at the time T,

$$s = \mp \frac{pe \cos n}{2} \ldots\ldots\ldots\ldots (12)$$

and in reference to the meridian at the time of transit,

$$s = \mp \frac{pe \cos n}{2g} \ldots\ldots\ldots\ldots (13)$$

From which follows that the hour angle of the greatest altitude is a maximum when n is zero, that is, when the true course is north or south, and zero when $n = 90°$, or the true course is east or west.

Moreover, it is worthy of note that the hour angle of the greatest altitude represents half the difference of the hour angles of all equal altitudes near the meridian.

JOHN MAURICE.
Civil Engineer and Nautical Expert.
CHICAGO, Sept., 1900.

(To be continued in next issue.)

THE range finder is of great service as an aid to navigation. It is very well known that the distance of any object at sea, and more especially the distance of a light, cannot be estimated with any approach to accuracy. So much is this the case that in certain weathers experienced navigators frequently mistake a distant light-house for a near ship's light and vice versa. The method sometimes adopted for determining the distance of an object on shore by observing the change of bearing upon a known distance run, is, of course, not applicable at all when the light is within some points of the bow (the most important case) and in any case it requires a considerable amount of time and may involve the incurring of great danger. The range finder will determine the distance of a light in a few seconds, and the light can, when necessary, be kept constantly in view and the distance read as frequently as desired.

MARINE RECORD

ESTABLISHED 1878.

Published Every Thursday by

THE MARINE RECORD PUBLISHING CO.,

Incorporated.

C. E. RUSKIN, - - - - Manager.
CAPT. JOHN SWAINSON, - - - Editor.

CLEVELAND, Western Reserve Building. CHICAGO, Royal Insurance Building.

SUBSCRIPTION.

One Copy, one year, postage paid, - - $2.00
One Copy, one year, to foreign countries, - - $3.00

Invariably in advance.

ADVERTISING.

Rates given on application.

All communications should be addressed to the Cleveland office,
THE MARINE RECORD PUBLISHING CO.,
Western Reserve Building, Cleveland, O.

Entered at Cleveland Postoffice as second-class mail matter.

No attention is paid to anonymous communications, but the wishes of contributors as to the use of their names will be scrupulously regarded.

CLEVELAND, O., OCTOBER 11, 1900.

ANOTHER COAST STEAMER.

The closing of the contract between the Detroit Ship Building Co. and H. T. Morley this week for an ocean-going steamship, opens up a new possibility in the shipbuilding business of the lakes. For some time contracts have been discussed, and some have been closed, for the construction of steamers adapted for a combination trade between lake ports and the Atlantic coast. The launching of the Wolvin boats in Lorain, the Paraguay, three weeks ago, and the Asuncion last week, placed the first of a fleet of coasters afloat, but there is a difference between these steamers and the newly contracted Morley boat. The Wolvin fleet, which will consist of four steamers and four tows, is modeled after the lake craft with machinery aft, the only distinguishable difference in the general lines being the placing of a bridge aft of the foremast instead of above the forecastle. The necessary protection to the hull and machinery from the salt water is furnished. The coal bunkers are forward of the engines, about where they are placed in the regular lake boat. This makes the steamer roomier, but there is the criticism of ocean men that it is impossible to maintain sufficient trim on a long journey to make the boats practical. The Wolvin boats have six hatchways of the narrow type of the lake vessel.

The Morley steamer is to be built for sea service, with heavier plate and the stem and stern pieces of a construction which is considered, under the English Lloyds, more rigid than the construction of the inland seas. Her cargo hatches will number two forward and two aft, all being the big style of hatchway adopted in ocean freighters. Her holds will be constructed for bulk freight only. She will be 260 feet over all, 40 feet beam and 26½ feet depth of mold. Her engines will be triple expansion, with seventeen 27½, and 46-inch cylinders and a 36-inch stroke. Her boilers will be Scotch type, 13½ feet diameter, 12 feet long and will work under a pressure of 165 pounds. She will be fitted with the Howden hot draft system. The "donkey" boiler will be 7½ feet diameter and 10 feet long. It is estimated that the boat will carry 3,000 gross tons with a depth of 20 feet, and make 10 miles loaded and 12 miles light.

HYDROGRAPHIC OFFICE NOTES.

LAKE SUPERIOR--PORTAGE LAKE SHIP CANAL ENTRANCE—CAUTION AS TO LIGHTS.—Capt. B. F. Howard, of the steamer Bon Voyage, reports that the lights at the Lake Superior entrance to the Portage Lake ship canal when in range lead on the eastern extremity of the western breakwater, now nearly finished.

The lantern which is supposed to be shown from the end of this structure by the contractor can not be depended on, especially in stormy weather, therefore great caution is necessary when entering this port at night.

LAKE SUPERIOR—-MICHIGAN—-GRAND PORTAL DESTROYED.—Information has been received that Grand Portal collapsed during a northeast gale September 17, 1900.

LAKE MICHIGAN—RACINE REEF BEACON LIGHT—INCREASED HEIGHT.—Between October 1 and October 10, 1900, the light shown on the structure on Racine reef, near the entrance to Racine harbor, western side of Lake Michigan, will be raised 20 feet by the addition to the structure of a light, pyramidal, skeleton frame.

The focal plane of the light will then be 57 feet above mean lake level. No other change will be made.

LAKE MICHIGAN—STRAIT OF MACKINAC—SURVEYING TRIPODS CARRIED AWAY.—With reference to Notice to Mariners No. 37 (1021) of 1900 and previous Notice, Lieut. Commander W. Winder, commanding the U. S. S. Michigan, reports under date of September 21, 1900, that the two floating tripods used in the survey of Grays Reef passage have been carried away by recent gales and will not be replaced.

LAKE ERIE—DANGEROUS FLOATING WRECKAGE WESTWARD OF LONG POINT.—Capt. Norman McGuire, of the steamer Avon, reports that the night of September 25, 1900, westward of Long Point, he passed a large floating piece of wreckage about 35 or 40 feet long, and about 15 feet wide, composed of heavy timbers of about 12 by 12 inches, which was apparently the end of a dock.

This obstruction was directly in the path of vessels running from point Pelee to Buffalo, and on the following bearings:

Long Point East lighthouse N. 65° E. true (E. N. E. E'ly mag.), distant $25\frac{6}{10}$ ($29\frac{1}{2}$) miles.

Long Point West lighthouse N. 21° E. true (N. N. E. ⅛ E. E'ly mag.).

Port Burwell lighthouse N. 32° W. true (N. N. W. ½W. W'ly mag.), distant $19\frac{3}{4}$ ($22\frac{3}{4}$) miles.

Mariners are warned accordingly.

FOR COAST AND LAKE TRADE.

The American Ship Building Co., now has 23 vessels under contract to come out next season. They are all freighters except the big car ferry steamer which will be built for the Pere Marquette Railway Co. In addition to the vessels that will be turned out at the yards of the American Ship Building Co., five other freighters will be built at lake yards and come out next season. Three of them are of the Welland canal size.

The Jenks Ship Building Co., of Port Huron is building a steamer on its own account; the Craig Ship Building Co., of Toledo is at work on a steamer to be a duplicate of the Tampico for the Hawgoods, and Mr. Crosthwaite of Buffalo is having a steamer for the coast built at his port. The Union Dry Dock Co., of Buffalo has two package freighters to get out for next season.

The list of the new vessels is a large one, but if present plans are carried out almost as many boats boats will go to the coast between now and next May. Arrangements have been practically made to send 16 down, and other owners are figuring on taking a chance on the coast, and the list will probably be swelled before the close of the season. Among the vessels that are almost sure to go down to the coast are the four Counselmen steamers, two steamers and two consorts for A. B. Wolvin and others; steamers Tampico and Eureka of the Hawgood fleet; two Crosthwaite steamers, whaleback steamer A. D. Thompson, and two consorts, and the new steamer ordered by Morley at Detroit. More of the whalebacks may be sent down. In addition to the vessels named nine other boats of the fleet can go through the canal if considered desirable to so place them.

LIQUID FUEL.

The great advantages to be derived by the use of liquid fuel have caused the principal maritime powers to continue their experiments in its use, both in their navies and merchant marine. For military reasons some of the powers have been less enthusiastic than others, while some have been satisfied to await results.

Russia has been the most energetic, and apparently, the most successful, in experimenting with liquid fuel. She is interested beyond the immediate advantages of the success of these experiments, owing to her great supply of oil and scarcity of coal. Its use has increased to such an extent in that country during the last few years as to cause a great rise in price, and the demand is increasing more rapidly than the production.

In an article written by Mr. N. Cherkassov on petroleum fuel for the volunteer fleet and Russian navy, he suggests, owing to the great demand for liquid fuel, that 10 per cent. be deducted annually by the Russian government, by way of impost, to secure a supply for the navy. Owing to the use of this fuel by the steamers on the Caspian (about 200) and those on the Volga (about 1,000), as well as most of the Russian railways and works so situated as to be able to use it, the total consumption has reached 4,840,000 tons per annum.

Mr. Cherkassov gives the following methods for supplying the fleets: "The Black sea fleet could be supplied by direct pipe lines and the Baltic fleet by depots at suitable places along the Volga, which could be supplied by water carriage from the Caucasus, and from which oil could be supplied to St. Petersburg and to the Baltic ports by rail or water carriage." This would make Russia independent of other countries for fuel supply for her fleet.

The components of the crude petroleum of the Caucasus, generally called raw naphtha, is given as 86.87 per cent. carbon, 12.19 per cent. hydrogen, 0.87 per cent. oxygen, and 0.06 per cent. sulphur, besides small quantities of oxide of iron, alumina, lime, copper, and traces of silver and gold. Astaki is the residue remaining (60 to 65 per cent.) in the distillation of the crude naphtha after separating from it the kerosene (30 to 35 per cent.) and benzine (4 to 5 per cent.), and this astaki forms the ordinary liquid fuel.

The great advantages in the use of liquid fuel in the navy are the facility of handling and transportation, absence of smoke, facility of managing the fires, and quickness with which steam can be raised and controlled.

The use of liquid fuel, with its facility of handling and transportation, was often referred to by our officers during the late war as one of the possibilities of the future. The strain upon the officers and men was intense when coaling alongside colliers at sea. Batteries had to be run in on many ships, and in some cases guns dismounted, to clear the colliers. Frequently holes were made in them by the motion of the vessels coaling alongside, and guns were in great danger of being knocked off their carriages and thrown out of action.

Liquid fuel can be supplied with a very high flashing point and can be considered as safe as coal for transportation, the temperature of ignition depending upon the completeness of distillation.

PITTSBURG TO LIVERPOOL.

A recent dispatch from Pittsburg reads as follows:

Having built his own steamships and railroad to carry ore from the Great Lakes to his mills Andrew Carnegie will have his own steamships to carry the finished product from Pittsburg to the markets of the world. The Carnegie company will open a new trans-Atlantic freight route on Nov. 5 between this city and Liverpool with the lakes and the Welland canal. If it is a success a smash in freight rates by the great trunk lines may be expected.

The Carnegie company is now working on the first shipment via the new route. It will be 4,000 tons of steel for Liverpool. After being loaded on cars at the Carnegie mills the stuff will be shipped via Pittsburg, Bessemer & Lake Erie Railroad, built by Carnegie to Conneaut Harbor on Lake Erie, 103 miles. This is the only rail haul on the route. At Conneaut the steel will be loaded into the Wenke, Harvey, Leafield, Paliki and Theano, these being the names of the chartered ships.

With additional cargo loaded in barges which will be towed to Montreal the ships will sail from Conneaut to Port Colborne, across Lake Erie at the entrance to the Welland canal, 75 miles. From Port Colborne to the other end of the canal at Port Dalhousie on Lake Ontario is 27 miles and from there across Lake Ontario to Kingston is 130 miles more. At Kingston the ships will enter the St. Lawrence river and St. Lawrence canals and steam to Montreal, 170 miles, where additional cargo carried in barges will be loaded into the holds of the ships. The latter will then go to Quebec, 160 miles, and from Quebec through the Belle Isle straits across the Atlantic Ocean to Liverpool, 2,502 miles.

The total distance from Pittsburg to Liverpool via this route is 3,267 miles. Via New York it is 3,425 miles. It now costs $7.50 per ton to ship a ton of steel billets from Pittsburg to Liverpool. Via the new route this will be reduced and the Pittsburg company will then be in a position to underbid the world.

THE French Minister of the Marine, by way of experiment, has given an order to the Forges et Chantiers de la Mediterranee for a 90-ton torpedo boat with turbine engines. The construction will be actively pushed along in the shops of this company, at Graville, near Havre.

THE TORPEDO BOAT DESTROYER BAILEY.

Illustrated.)

BUILT BY THE GAS ENGINE & POWER CO. AND CHARLES L. SEABURY & CO., (CONSOLIDATED)—NEARLY COMPLETED.

In consequence of the preliminary trial and near approach of the official trial trip of the Bailey, the first torpedo boat destroyer to be built in Morris Heights, N. Y., for the government, we take pleasure in giving the readers of the MARINE RECORD a short description of this vessel accompanied by a half-tone taken from a photograph during a short builder's trial trip on the Hudson. The contract for the Bailey was awarded the Gas Engine & Power Co. and Charles L. Seabury & Co., (consolidated), of Morris Heights, N. Y., July, 1897, and after the Navy Department furnishing the principal dimensions and requirements, the design of the boat was left entirely with the company. The main feature after strength and adaptability were considered, was the speed, which was to be 30 knots per hour. This was a responsiblity that the builders did not hesitate to assume, and well known experts who have examined the plans of the Bailey believe that she will be able to add three knots to the maximum speed imposed.

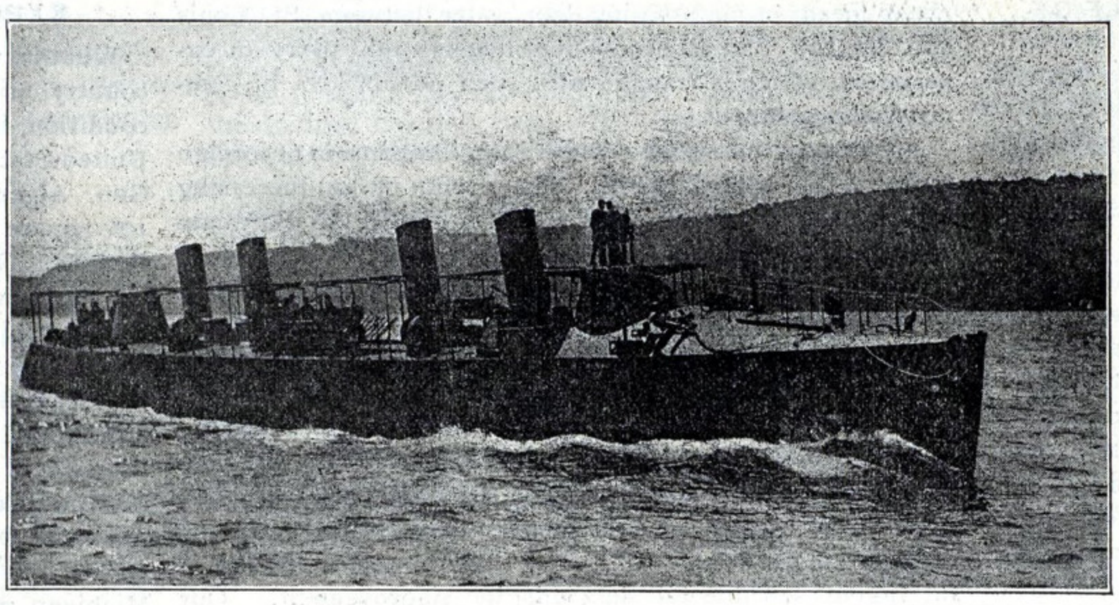
It does not require much of an expert to become of the same opinion when considered that this craft of only 205 feet in length, 19 feet beam and 13 feet depth of hold, and a displacement of 235 tons when on her official trial, will be supplied with machinery that will develop 5,600 horse-power—more than half the horse-power developed by some of our speediest 8,000 ton trans-Atlantic steamships. The Bailey's engines are of the four-cylinder triple-expansion type. The diameters in inches for the high, intermediate and low pressure cylinders respectively are 20, 30½ and 32, stroke 18 inches, and when developing 5,600 horse-power her propeller wheels will be making about 400 revolutions. Four Seabury water tube boilers will furnish the steam, each one having its own separate smokestack. The working pressure of steam will be 250 pounds to the square inch.

The armament will be a powerful one for a boat of this type. It will embrace four 6-pounder rapid-fire guns, and three 18-inch torpedo discharge tubes. The latter are for Whitehead torpedoes. This is the first craft of this type to be supplied with six-pound guns. The Bailey is practically a seagoing vessel. She will berth 33 men forward and seven officers aft. The officers' berths are on the Pullman plan, folding against the side of the vessel. The bunker capacity is deemed sufficient to enable her to steam three thousand knots at economical speed. In time of war she may be expected to accompany the battleship fleet, and to serve both as a scout and defense for the heavier vessels. The official trial trip of the Bailey will take place some time about the middle of this month, and the event is one that will be watched with a great deal of interest by foreign naval officials as well as American. The trial weights of this vessel must not be under the following figures: Hull, 67.5 tons; machinery, 115 tons; water, 10 tons; ordnance, 12.6 tons; coal, 20 tons; and equipments, 9 tons.

The torpedo boat destroyer Stewart and the torpedo boat Wilkes, the contracts for which were awarded the Gas Engine & Power Co. and Charles L. Seabury & Co., in September, 1898, are progressing as rapidly as material is received.

These government vessels building by this company, while an important factor, are by no means their greatest industry. Their steam yacht and naphtha launch business combined is the most extensive in that line of any one concern in the United States. The exclusive control of their own modern and improved designs in naphtha engines, steam engines, and the well-known Seabury water tube boilers, enables them to furnish entire the very best possible machinery as well as hull and cabin work; and to these they have added shops for furnishing, upholstering, decorating, electric lighting, etc., so that any boat built by them bears from keel to truck the impress of their methods, and is characterized in every part by the trustworthy qualities for which their product is especially distinguished. This concern also does all kinds of repairs, and furnishes all parts of marine machinery. They have the best of winter accommodations, including commodious storage basins, inclosed sheds, marine railways, etc. Insurance and brokerage, buying and selling boats and charters on a commission basis at regular rates, are other departments of their business. Anything that can be launched in the Harlem river this company have room to lay down and complete in every part.

This company's naphtha launches (the original) float upon the inland waters of the United States more extensively than any similar craft known. They are used not only for pleasure, but for business purposes, the United States government having purchased upward of one hundred of them for service in the coast survey, customs, quarantine, light-house and engineering departments, and they are largely employed in the transportation of passengers and light freight, towing of barges, working oyster beds, and, in fact, for almost everything in which a small power boat could be utilized. There are at the present time nearly 3,000 of this company's naphtha launches in use in this and foreign countries.



THE TORPEDO BOAT DESTROYER BAILEY.

TOWING AT SEA.

We notice continually articles and notices in the American press commenting on the development of towing, both on the Great Lakes and the ocean, and as the question is fraught with great interest to the shipping community we have made some inquiries as to the methods used and the results. It appears in 1886 two American inventors, one of whom was a master mariner, and the other an engineer, brought out a machine which they claimed made it possible to tow a number of barges in exposed situations with safety. The machine was constructed and placed with the consent of the Boston Tow Boat Co. on their steam collier Orion, in February, 1888. It was adopted by the company, and has remained in use ever since, and proved to be the precursor of some hundred others now in use on the Great Lakes, the Pacific, and the Atlantic. One has even found its way to Europe, and has made it possible for an enterprising Swedish company to tow immense rafts of timber with great economy. An inquiry was made recently from this company, the Ohrvikens Aktiebolag, as to their experience, which now extends over two years. They reply in terse English that they could not do without the machine, as they would not dare to run the risk of towing in the old-fashioned way. They also state that they have had the same hawser in use for two years, and see no reason why it should not last a number of years longer. It will be understood in a matter like this, while it affects at the moment, a limited number of people, owing to the slight extent that towing is used in Europe, it may result in a radical reduction in freight rates for bulk cargoes. It is quite possible that in the next few years we shall see barges being towed to the coaling stations in the Mediterranean, not to speak of the coast of the United Kingdom. It is quite possible for a steamer to carry 3,000 tons, and to tow three consorts, each carrying 3,000 tons, with very little increased engine power, at a slightly increased coal consumption, and with perfect safety. The Shaw & Speigle towing machine has been shown to handle these immense weights with the skill and tenderness that a skilled whip will handle a team of horses. This simile gives as good an idea of the working of the machine as we can suggest. It practically gives and takes to the surges of the tows, as the driver keeps the touch of the mouths of his charges. This action is entirely automatic, and renders it possible for a wire hawser to be used on which there is little wear and tear. All practical tugboat men agree that a great deal of energy is saved if a manila hawser can be done away with. The drag of a heavy manila line in the water alone represents a great loss of power. Which of our shipping men will be enterprising enough to afford us an opportunity of inspecting this new wonder at work? We are now ten years behind America and two behind Sweden, and, although it is acknowledged that American capital is now being invested in English ocean-going steamers, we would be sorry to see it make an entrance into our home trades. The machine is manufactured by the American Ship Windlass Co., of Providence, R. I., whose celestial-sounding trade mark, "Providence," is so well known to shipmasters. While refering to them, they must be congratulated on securing an only gold medal for steam windlasses at the Paris Exhibition. Surely this is an award that might have been secured for England.—Liverpool Journal of Commerce.

EASTERN FREIGHTS.

Messrs. Funch, Edye & Co., New York, report the condition of the Eastern freight market as follows:

Since our last advices the market for steam tonnage has developed a declining tendency in consequence of freer offerings of tonnage, to which charterers at Atlantic cotton ports have latterly responded by entire withdrawal from the market, whilst shippers of grain from range of ports, following temporary decline in berth rates, have reduced their bids for prompt tonnage. Rates at the Gulf ports have been well maintained, and it appears probable that charterers for timber will be in the market again at some concession from last rates bid. Time charters appear generally indifferent to further charters, and when compelled to go in the market will not engage themselves for long terms. Coal shipments are the unknown factor on the market; whilst it is conceded that at present freight rates, fresh sales cannot be effected, it is generally supposed that ample purchases, made some time ago, are still uncovered by freight. Should this supposition turn out to be correct, these shipments will be of great value as a steadying quantity in our freight market.

The scarcity of sail tonnage is making itself felt in increasing measure, business becoming seriously hampered in consequence. Distant tonnage is obtainable at much lower rates, but shippers are not anxious to commit themselves for such.

A LARGE DREDGE LAUNCHED.

One of the two dredges being built by the Maryland Steel Co. for the Metropolitan Dredge Co., New York, was launched on Oct. 2 from the ways of the builders at Sparrow's Point. The dredge was christened Thomas. It is the largest seagoing, self-propelling dredge in this country, and her owners will employ her in dredging the new East Channel of New York harbor, for which they have received the Government contract. Her dimensions are: Length, 300 feet; beam, 52½ feet; depth of hold, 26 feet. The engines are triple-expansion, with cylinders 10, 28 and 45 inches in diameter, with a piston stroke of 28 inches. The dredging apparatus, which includes a 48-inch centrifugal pump and suction pipe forty feet long, are in the forward part of the dredge. The hull of the Thomas has a sufficient capacity for 28,000 cubic feet of soil, and an hour is the time required to load.

ANOTHER RACE.

Sir Thomas Lipton informed a representative of the Associated Press that his challenge was on board the White Star Liner Germanic due at New York Thursday. But he preferred all information as to its contents to be given out by the New York Yacht Club first.

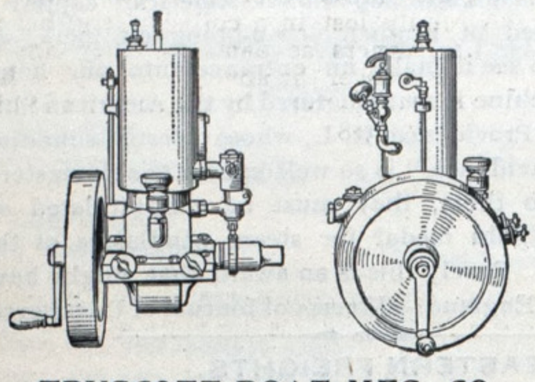
The letter challenging suggests, it is understood, that the race be held in August.

THE introduction of the mechanical stoker for naval purposes has been under consideration, it is understood, for some time past, but thus far the various types have not been competitively tested, and the Navy Department feels some hesitation in installing a new departure without more experience in the matter.

H. W. JOHNS MFG. CO., 100 William St., New York City, recently secured a contract from the Pittsburgh Plate Glass Co., Ford City, Pa., for furnishing and applying the Asbestos Fire Felt Covering for their factory No. 3, in which plant they are now installing twelve new boilers and the necessary steam pipes. The contract in question will amount to over $2,000.

Truscott

VAPOR MARINE MOTORS.
HIGH GRADE PLEASURE CRAFT.



TRUSCOTT BOAT MFG. CO.
ST. JOSEPH, MICH.

SEND 5 STAMPS FOR CATALOG.

Pintsch Gas Lighted Buoys.

Adopted by the English, German, French, Russian, Italian and United States Light-House Departments for channel and harbor lighting. Over 1,000 gas buoys and gas beacons in service.

Burn Continuously

from 80 to 365 days and nights without attention, and can be seen a distance of six miles. . . . . .

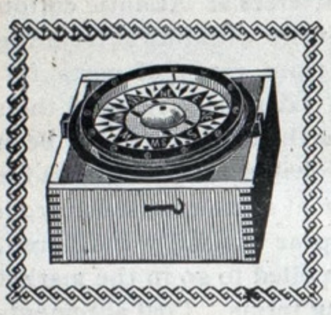
Controlled by

THE SAFETY CAR HEATING AND LIGHTING CO.
160 Broadway, New York City.

BAINES BROS.
PROVISION MERCHANTS AND SHIPPERS OF
BEEF, MUTTON, PORK & POULTRY
LARD, SAUSAGE, ETC
VESSEL SUPPLIES A SPECIALTY
43, 44 & 45 ELK STREET MARKET
BUFFALO, N.Y.
PHONE SENECA 346

Cleveland Telephone, Glen. 87 F.

CHAS. R. DITTRICK,
SUBMARINE DIVER
Day or Night Calls Answered Promptly.
21 Everton Street, GLENVILLE, O.



THE Bliss LIQUID (Spirit) COMPASS

Made in seven sizes by JOHN BLISS & CO., 128 Front Street, New York, is finely finished sensitive, accurate and durable. Moves quickly and is extremely steady. Is the best Liquid Compass ever made in this or any country. For sale by ship chandlers generally.

DEEP WATER CHANNEL TO THE GULF OF MEXICO.

The following article on a deep water route from St. Louis to the Gulf of Mexico was contributed to the St. Louis Chronicle, by Prof. S. Waterhouse, of Washington University:

The importance of a deep-draught channel to the gulf is incalculable. In cheapening the transportation of cereals and bulky merchandise, in reducing railroad rates by the competition of the river and in saving unnecessary costs and delays, such an improvement of the Mississippi as would make St. Louis the head of deep water navigation would greatly promote the commercial interests of this metropolis.

Its great achievements justify the belief that civil engineering can deepen the channel of the Mississippi and secure for St. Louis the benefits which unobstructed navigation would bestow. Piling, wing dams, revetments and jetties are useful means of increasing the depth of the stream or preventing the erosion of its banks. But even if all attempts to construct permanent improvements should prove to be only partially successful, there is still a way to attain deep water. Recently dredges of enormous power and efficiency have been invented.

The Bates dredge is composed of two boats, placed side by side. When it is required to cut a narrow channel or pass through a canal, the boats can be disconnected and act independently In tests, conducted under conditions less favorable than those which the Mississippi presents, the records of performance were as follows:

Boat No. 1. Length of cut through sandbar, 1,200 feet; time, 76 minutes; progress per minute, 17.78 feet; depth of cut, 3.38 feet; width of cut, 31 feet; capacity per hour, 2,590 cubic yards.

Boat No. 2. Advance per minute, 10.13 feet; depth of cut, 5.66 feet; width of cut, 31 feet; capacity per hour, 3,824 cubic yards.

In an official trial the compound dredge, cutting a passage 62 feet in width, excavated 7,800 cubic yards of sand per hour, and a service of 7,000 cubic yards an hour was stated to be its average capacity.

The sand excavated by the dredge is carried back in long flexible discharge pipes, sustained by pontoons, and may be used to strengthen the embankments or fill littoral depressions.

By lowering the cutters any required depth of water can be secured. In high water, dredges would be unnecessary, and in low water the scour of the current would tend to preserve the artificial channel. The passages which the sediment of every flood would fill would have to be reopened after the subsidence of the overflow, so that, in the intermediate stages between high and low water, the service of dredges would be frequently needed. These powerful machines seem to afford a rapid, effective and comparatively cheap means of maintaining deep water between St. Louis and the Gulf. At all events our citizens ought to try an experiment, which is fraught with such possibilities of commercial enrichment.

Apparently there will soon be a large expansion of foreign trade of the United States. The profits of an increasing traffic with Cuba, Porto Rico, South America, the Hawaiian and Philippine Islands, and the Orient are the prizes that incite our countrymen to greater mercantile activity. If St. Louis would secure its full share of this commercial prosperity, it must alertly develop and utilize every facility for cheap transportation. With an equality of natural advantages, the most prosperous cities are those that thoroughly enlighten their industries with technical science and provide the most economic means for the transaction of business. The Mississippi river is an important factor in the commercial growth of St. Louis. The powerful motive of intelligent self-interest demands its improvement. Our citizens ought strongly to advocate every measure that will lower the bed of the Mississippi, increase the volume of its waters, or prevent the occurrence of floods. Dredging will cut a deeper channel; storage basins, whose contents are released in the season of low water, will insure a more uniform depth of current, and the preservation of our northern forests will tend to obviate sudden overflows.

Our forests materially affect the navigation of our rivers. They increase the rainfall and permit its absorption and gradual seepage into the streams. They feed the rivers with larger and steadier supplies of water. As the forests are felled, the precipitation decreases and the streams become shallower. Without the moisture of the woodlands, the heat and dry winds would harden the ground, so that, whenever there were heavy rains, the water absorbed by the compact soil would rapidly run into the streams and cause floods, which, apart from their damage to agriculture, would be apt to undo the work of the river engineers.

The attainment of these advantages and the prevention of these injuries to navigation require Congressional action. To secure the passage of measures that will establish vast reservoirs around the head waters of the Mississippi and its upper tributaries, to obtain the large appropriations that are necessary to maintain a deep-draft channel to St. Louis, and to procure such legislation as will reasonably preserve the forests of the north-west, the citizens of this metropolis ought to exert every energy.

The accomplishment of these great results and the completion of the Nicaragua canal would more fully equip this city for the keen competitions of foreign trade, and hasten the realization of that commercial greatness which its central situation and matchless facilities for transportation by river and rail destine St. Louis to achieve.

The underwriters holding the $35,000 insurance on the steamer Specular, sunk several weeks ago in Lake Erie by the steamer Denver, have decided to abandon the wreck. As she is well to the south of the main passage the Specular is not considered a menace to navigation.

EXPORTATION OF LOGS PROHIBITED.

What is true of Michigan is true of the remainder of the country and the fact that Canadian logs cannot, under any condition, be brought across the border and sawed in the United States has its effect in the remotest part of the Union. Gen. Alger has sold the last of his Ontario lumber limits, 108 square miles on the north shore of Lake Huron, to Ferguson & McFadden, of Renfew, Ont., for $150,000, and has purchased $500,000 worth of pine in Minnesota.

"We sold our Canada holding because we could not make any money under the restriction requiring all Canadian logs to be sawed in Canada," said Gen. Alger. "Please bear in mind that I am not criticising Canada. I am informed that they would have stood the $1 tax, the amount of the old McKinley law, but the $2 they would not stand, and they retaliated by putting on this restriction. If we were to go on lumbering in Canada we would have to close up our Michigan mills and build new mills there, and I found I could do better with my money by selling out my Ontario holdings at a loss and purchasing lands on this side of the line. There is no political significance whatever in what I have done. I have large interests in Canada yet. We are lumbering along the north shore of Lake Superior, and I have large interests in the Laurentides Pulp and Paper Co., on the St. Maurice river, Quebec.

"I would buy land in Canada as quickly as anywhere else; it is only a matter of dollers and cents. I have been treated with all possible consideration in Canada, but there is no sentiment in business."

VISIBLE SUPPLY OF GRAIN.

As compiled for THE MARINE RECORD, by George F. Stone, Secretary Chicago Board of Trade.

CITIES WHERE STORED.	WHEAT. Bushels.	CORN. Bushels.	OATS. Bushels.	RYE. Bushels.	BARLEY Bushels.
Buffalo	4,124,000	241,000	594,000	4,000	356,000
Chicago	13,402,000	2,838,000	3,502,000	489,000	20,000
Detroit	383,000	29,000	222,000	73,000	11,000
Duluth	6,506,000	35,000	23,000	110,000	401,000
Fort William, Ont.	828,000	.....	.....	.....	.....
Milwaukee	744,000	81,000	237,000	.....	47,000
Port Arthur, Ont.	94,000	.....	.....	.....	.....
Toledo	1,282,000	330,000	1,530,000	24,000	2,000
Toronto	52,000	.....	1,000	.....	97,000
On Canals	349,000	559,000	120,000	61,000	159,000
On Lakes	2,012,000	2,265,000	483,000	.....	509,000
On Miss. River	.....	.....	.....	.....	.....
Grand Total	55,401,000	7,887,000	12,019,000	935,000	1,926,000
Corresponding Date, 1899	44,335,000	14,750,000	6,630,000	806,000	1,731,000
Increase	.....	395,000	594,000	9,000	462,000
Decrease	8,000	.....	.....	.....	.....

While the stock of grain at lake ports only is here given, the total shows the figures for the entire country except the Pacific Slope.

EXAMINATION FOR NAVAL DRAFTSMAN.

The United States Civil Service Commission announces that on October 23, 24 25 and 26, 1900, an examination will be held in any city in the United States where it has a local board of examiners, for the position of mechanical draftsman for marine engines and naval construction. The examination will consist of the following subjects: Applied mathematics, design and constructional details, drafting, technical education and experience. Competitors should provide themselves with all instruments necessary in drafting work. Special credit will be given for experience in naval drafting work. It is the desire of the department that the appointee in this position have a good general education and be of genteel appearance and manners, for the reason that he will be required to assist in the instruction of naval cadets. The subject of drafting will embrace freehand sketching of models submitted; the making of working drawings of the same to scale; complete pen and ink drawings of other pieces of mechanism, including tests in block-lettering; also the making of complete drawings to scale from portions of blueprints of machinery submitted, etc. From the eligible resulting from this examination it is expected that certifications will be made to the position of draftsman at the naval Academy at a salary of $4.00 per diem, and to similar vacancies as they shall occur. Persons who desire to complete should at once apply at the United Civil Service Commissioners, Washington, D. C., for application forms 304 and 375, which should be properly executed and promptly filed with the commission.

VESSELS CLASSED.

Vessels classed and rated this week by the American Bureau of Shipping in the Record of American and Foreign Shipping: Bark Rebecca Crowell, schooner C. B. Clark, schooner Nelson E. Newbury, schooner City of Baltimore, schooner William H. Shubert and British brig Ocean Belle. Schooner Almeda Willey, schooner John W. Dana, British schooner Britannia, British schooner Clifton, and British schooner Mapleleaf.

NOTICE TO MARINERS.

LIGHT-HOUSE ESTABLISHMENT,
OFFICE OF THE LIGHT-HOUSE INSPECTOR, 10TH DISTRICT,
BUFFALO, N. Y., October 4th, 1900.

Notice is hereby given that Galloo Island Shoal Gas Buoy, No. 1, Lake Ontario, New York, which was reported out of place on September 25, 1900, was replaced October 1st, 1900, in its proper position on the southwest side of Galloo Island shoal.

MUSKEGON LAKE BEACON LIGHT.—Notice is hereby given that, on or about October 10, 1900, the intensity of this light, on the northerly side of the inner entrance to Muskegon Lake, will be increased by changing it from a lantern to a lens-lantern light.

No other change will be made.

RACINE BREAKWATER BEACON LIGHT STATION.—Notice is hereby given that, on or about October, 13, 1900, a fixed red post-lantern light will be established at the southerly end of Racine breakwater, Racine Harbor, westerly side of Lake Michigan. The light will be suspended from a brown iron post, at a height of about 30 feet above mean lake level.

Immediately in front of the lake side of the post there is a V shaped timber protection 6 feet high and 18 feet each way.

By authority of the Light-House Board.

FRANKLIN HANFORD,
Inspector 10th L. H. District. Commander, U. S. N.

J. H. Darling, U. S. Asst. Engineer, at Duluth, reports that the mean level of Lake Superior in September, by the U. S. gauge, at Marquette, was 1.71 feet above low water datum. This is 0.52 higher than for the preceding month, and is 0.51 more than the normal rise, which is 0.01 from August to September, the water being usually stationary for those two months and at the highest for the year. The stage for last month was 0.10 feet lower than in Sept. 1899 a year ago, but is 0.87 higher than the average September stage for the 26 years from 1872 to 1897, and should be very satisfactory to vessel men. United States Forecast Office Richardson gives the rainfall for the month as 4.80 inches, which is 1.18 in excess of the normal for September.

DOMINION OF CANADA—ONTARIO.

1. CHANGE IN SAILORS' ENCAMPMENT RANGE LIGHTS.—The two red lights, hitherto maintained in the axis of the old cut at Sailors' Encampment, known as Sailors' Encampment upper range (Canadian) lights will, on and after the 17th instant, be discontinued, and the axis of the Sailors Encampment new cut, now marked at its lower end by the Pilot island (United States) range, will be marked at the upper end by two fixed white lights established on the sites of the day beacons on Rains hill, St. Joseph island, at the upper end of the cut.

The front light is situated on the east side of the shore road, about 600 feet S. 30° E. true from the old front light, and is shown from a lantern elevated 50 feet above the water on a mast. It should be visible 5 miles in the line of range. The illuminating apparatus is catoptric.

At the foot of the mast, which is 17 feet high, is a diamond shaped day beacon painted white, with a vertical black stripe through the middle of it.

The back light is situated 648 feet N. 14° 35′ E. true from the front light, and is shown from a similar lantern elevated 70 feet above the water. At the foot of the mast, which is 22 feet high, is a diamond shaped day beacon painted white. Going up the river, these two range lights kept in one ahead, N. by E. ½ E., (N. 14° 35′ E. true), indicate the middle of the dredged channel from Mud lake turning gas buoy to the alignment of Point of Woods range lights.

LIME KILN CROSSING BUOYS.—On or about the 20th instant the eastern edge of the dredged cut through Lime Kiln Crossing, in the river Detroit, above Amherstburg, will be marked by the Canadian government, by three red spar buoys moored respectively at the upper end, in the middle and at the lower end of the Canadian side of the dredged deep channel. The buoys will be moored in 20 feet of water, as close to the rock side of the cut as possible, and this side of the cut should be favored by upward bound vessels.

The two light vessels maintained by the American government will, as heretofore, mark the west edge of the channel.

These buoys will be taken in and put out at the same time as other buoys in the Detroit river.

F. GOURDEAU,
Deputy Minister of Marine and Fisheries.
Department of Marine and Fisheries,
Ottawa, Canada, 22nd September, 1900.

☞ All bearings, unless otherwise noted, are magnetic and are given from seaward, miles are nautical miles, heights are above high water, and all depths are at mean low water.

Pilots, masters or others interested are earnestly requested to send information of dangers, changes in aids to navigation, notices of new shoals or channels, errors in publications, or any other facts affecting the navigation of Canadian waters to the Chief Engineer, Department of Marine and Fisheries, Ottawa, Canada.

SHIPPING AND MARINE JUDICIAL DECISIONS.

Right to Priority in Distributing Damages.—Where both vessels were in fault for a collision in which one was sunk, with her cargo, the cargo owner has the superior lien upon the fund available for reparation, in the absence of the contract affecting such right. In re Lakeland Transp. Co , 103 Fed. Rep. (U. S.) 328.

Total Loss of Vessel—Measure of Damages.—Where a vessel is sunk and totally lost in a collision, and her full value is awarded her owners as damages, they are not entitled, in addition, to recover the amount she would have earned under an unexpired charter. In re Lakeland Transp. Co., 103 Fed. Rep. (U. S.) 328.

Contracts with Passengers.—The tickets sold passengers from Seattle to Dawson contained a provision by which the purchaser waived the right to hold the vessel or charterer responsible for any damage sustained by their failure to forward him to his destination, unless resulting from actual negligence or incompetency of the carrier, and providing that if he could not, for any reason, be safely landed at the port of destination, he might be landed at the next port at which such landing could be safely made. Held, that such provision contemplated only a case of necessity arising otherwise than by default of the carrier, and could not be invoked by the charterer as requiring the captain of the vessel to land his passengers at some other port than St. Michaels, where there were no military authorities to interfere, and where they would be left unprovided for, in violation of their contracts. The Progreso, 103 Fed. Rep. (U. S.) 505.

Shipping—Breach of Charter—Default of Charterer.—A steamship company organized for the purpose of doing a transportation business between Seattle and Alaskan points chartered a steamship for two trips between Seattle and St. Michaels. She was loaded with passengers, a large number of whom were sold tickets through to Dawson, and a cargo, much of which was contracted to be delivered at the same place. The company sent an agent on the vessel, but, as its officers knew, he was without sufficient funds to carry out its contracts from St. Michaels, and the company was insolvent and without credit. On reaching St. Michaels the military authorities refused to allow the landing of the passengers until arrangements were made to forward them to their destination. In this emergency the captain took charge of affairs, compelled the company's agent, by threats of criminal prosecution, to turn over all claims for freight, took possession of the company's supplies, and certain coal merchandise which had been purchased by the company, but not paid for, and shipped on the vessel, and paid for the same to the vendors. By the funds and supplies so secured, and the money received from passengers for the return trip, and by pledging his vessel for the deficiency, he secured passage for his passengers to their destination, and was enabled, after a considerable delay, to discharge his vessel. Held, that as the vessel was bound, not only to carry her passengers and cargo, but to discharge them at the end of the voyage, the failure of the charterer to provide for the same was a breach of the charter, which justified the captain in an action taken by him, and gave the charterer no cause of action against the owners, beyond requiring an accounting, and that the owners were entitled to recover the excess of fulfilling the charterer's transportation contracts over the amounts realized by the captain; such expense being necessary to enable the vessel to discharge, and to fulfill her own obligations. The Progeso, 103 Fed. Rep. (U. S.) 505.

Walter Oades, after having made a survey of the wreck of the schooner J. S Richards, on the middle ground below Belle Isle bridge, Detroit river, reports the hull is damaged beyond repair.

S. F. HODGE & CO.
MARINE ENGINES,
PROPELLER WHEELS,
DECK HOISTERS,
MARINE REPAIRS.
312 ATWATER STREET,
DETROIT, MICH.

Chas. E. & W. F. Peck,
58 William Street, New York City. Royal Insurance Building, Chicago, Ill.
C. T. BOWRING & CO.
5 and 6 Billiter Avenue, E. C., - London, England.

Insurance
BROWN & CO., - - - 202 Main Street, Buffalo, N. Y.
A. A. & B. W. PARKER, 15 Atwater St., W. Detroit, Mich.
J. G. KEITH & CO., - 138 Rialto Building, Chicago, Ill.
LA SALLE & CO., Board of Trade Building, Duluth, Minn.
Are prepared to make rates on all classes of Marine Insurance on the Great Lakes, both CARGOES and HULLS.

Marine Valve Oil,
Eldorado Engine Oil,
Victor Signal,
Arctic Cup Greases,
Renown Engine Oil,
Atlantic Red Engine Oil,
Mineral Seal Oil,
are trade mark brands manufactured by the
Standard Oil Company
and found on sale at all lake ports.
The best goods are most economical. Remember the names.

THE Y&L

Steamboat Fuel at Chicago.

YOUGHIOGHENY and LEHIGH COAL CO.

J. T. CONNERY, Manager. ARCHIE J. HITCHCOCK, Dock Supt.

MAIN OFFICE: 1238-1242 Chicago Stock Exchange Building.

Long Distance Telephone, Main 5049. 110 LA SALLE STREET.

FUEL DOCKS: No. 1, Michigan Slip and Basin. 'Phone 3046, Main.
No. 2, N. Halstead St. Bridge. 'Phone 773, North.

FUEL LIGHTER: Equipped with 125 2-ton Buckets for Fueling anywhere in Harbor

WE PRODUCE OUR YOUGHIOGHENY COAL AND GUARANTEE QUALITY.

PICKANDS, MATHER & CO.

PIG IRON.
IRON ORE AND COAL.

FUEL LIGHTERS AT BUFFALO, ERIE, ASHTABULA, AND CLEVELAND.

At DETOUR, MICH., A FUEL DOCK equipped with Shute capacity of 600 Tons.
Best Quality PITTSBURGH COAL furnished at any time during Day or Night.

WESTERN RESERVE BUILDING, CLEVELAND, O.

PERFECT VENTILATION

For steamships and all kinds of places most difficult of ventilation. The McCreery Cooling, Cleansing Heating and Ventilating System is equaled by no other. We refer by permission to the following firms:

FRANK E. KIRBY, Mechanical and Constructing Engineer Detroit, Mich.
The WM. CRAMP and SONS, Ship and Engine Bldg. Co., Philadelphia, Pa.
MORSE IRON WORKS CO., foot 26th and 27th Streets, Brooklyn, N. Y.
DAVID CARTER, Manager Detroit & Cleveland Navigation Co., Detroit, Mich.
T. H. NEWMAN, Manager Cleveland & Buffalo Transit Co., Cleveland, Ohio.
SPITZER & CO., Bankers, Spitzer Buuilding, Toledo, Ohio.
F. A. FORBES, General Manager Michigan Telephone Co., Detroit, Mich.
JOHN & F. P. GORDON, Traffic and Steamboat Managers, Buffalo, N. Y.
W. L. GUILLEUDEU, Pres. Old Dominion Steamship Co., Pier 26, North River, N. Y.
ALEXANDER McVITTIE, Pres. Detroit Ship Building Co., Detroit, Mich.
Capt. JAMES A. SMITH, Gen. Supt. Old Dominion Steamship Co., Pier 26, North River, N. Y.

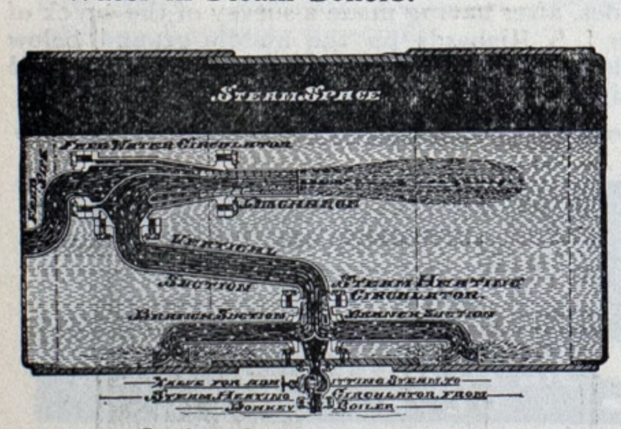
JOSEPH McCREERY & SON, Patentees and Manufacturers, TOLEDO, OHIO.

Scott's Coast Pilot

FOR THE LAKES.
PRICE $1.50.
For Sale by
The Marine Record,
Western Reserve Building,
CLEVELAND.

For Heating and Circulating the Water in Steam Boilers.

THE EQUILIBRIUM CIRCULATOR AND STEAM HEATING ATTACHMENT



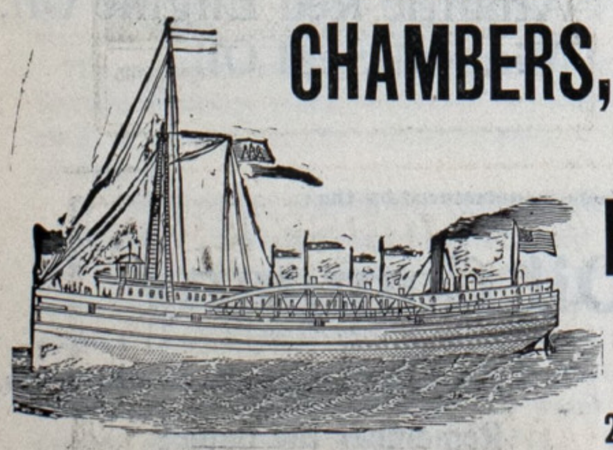
Section of Apparatus in Boiler.

Saves coal or increases steaming capacity 5% to 15%.
Prevents foaming or priming or pitting.
Reduces repairs. Saves leaks.
Prolongs life of boiler.

106 IN USE. 50 ORDERED.

H. BLOOMSBURG & CO.
112 35th St. Newport News, Va.

G. G. JACOBS, PRESIDENT. H. G. THOMPSON, SEC'Y-TREAS.
J. J. CHAMBERS, MGR. AND SUPT.



CHAMBERS, THOMPSON & CO.,

DEALERS IN

HARD AND SOFT COAL.

Steamboat Fuel A Specialty.

211 Main Street. Tel. Main 523 F.

CLEVELAND, O.

M. A. HANNA & CO.

COAL, IRON ORE AND PIG IRON.

Steamboat Fuel at Ashtabula.

Large Supplies of Best Quality.

Fuel scow with elevators and discharging spouts. Storage of 650 tons. Discharges 150 tons an hour into steamers while unloading cargo.

LIGHTER carrying different grades at all times.

MINERS AND SHIPPERS.

MAIN OFFICE, Perry-Payne Bldg., Cleveland, O.

THE W. L. SCOTT COMPANY,

ERIE, PA.

WHOLESALE DEALER IN

Shamokin-Wilkes Barre ANTHRACITE.
Youghiogheny, Mansfield, PITTSBURG.

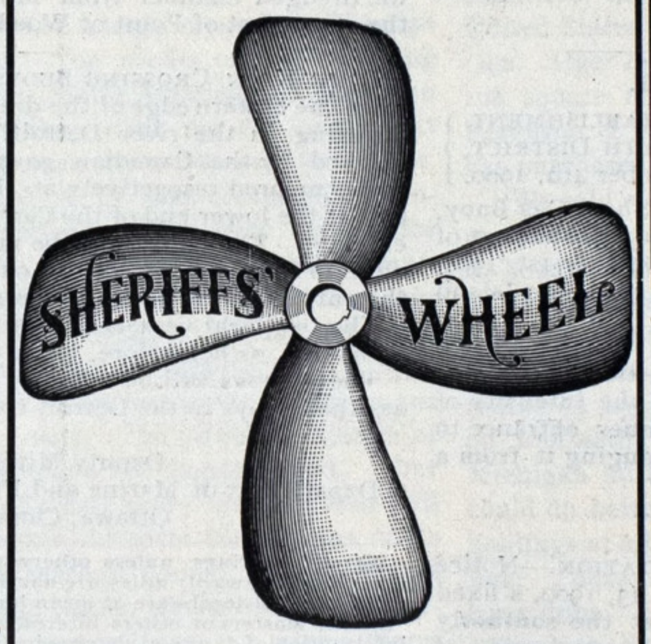
Vessel Fueling a Specialty by steam lighter or car dump, at all hours. Electric light.

...Coals

MAIN OFFICE: SCOTT BLOCK. LONG DISTANCE 'PHONE 440.
FUELING OFFICE: CANAL DOCK. LONG DISTANCE 'PHONE 320.

SHERIFFS MFG. CO.

ESTABLISHED 1854.



MILWAUKEE, WIS.

JOHN MAHER, TREAS.
GEO. HIRSCH, GEN'L MGR.

CUYAHOGA BOILER WORKS,

139 WEST RIVER ST.,

CLEVELAND, - OHIO.

FOR SALE

New Steamboat Hull.

Built for passenger and freight service. Suitable for lake and river work; good sea boat. Dimensions, 97 feet over all; 18 ft. beam. Stem, stern, frames, keel and keelson of white oak; planking of oak and long leafed yellow pine. All fastenings of galvanized iron. Vessel thoroughly salted. Hull of fine lines, and would be very fast with good machinery. Has high pressure engine, 14x14 in., but no boiler. Will sell as she stands cheap for cash, or will fit out complete in first-class way. Photograph, if desired. Address,

FRANK W. REYNOLDS,
CANAJOHARIE, N. Y.

If U Want a PUMP or SYPHON

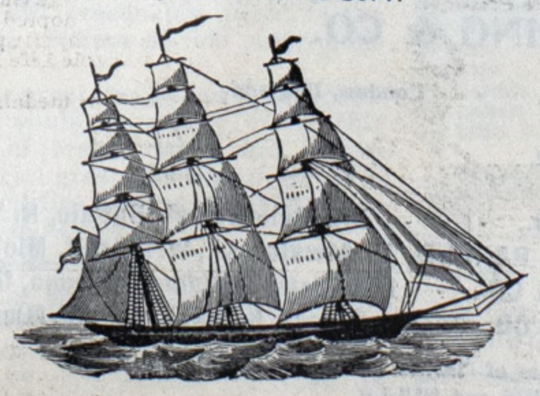
Write to the E.W. Vanduzen Co. of Cincinnati, O., for their catalog 76. They give you facts and figures about their Steam Jet Pumps, Syphons and Barge Pumps. A postal will bring full information by return mail free of charge.

THE E. W. VANDUZEN CO.,
Cincinnati, O.

Independent Ship Building and Repair Company,

CLEVELAND, O.

A. I. JACOBS, MANAGER AND SUPT.



Repair Work Promptly Attended to.

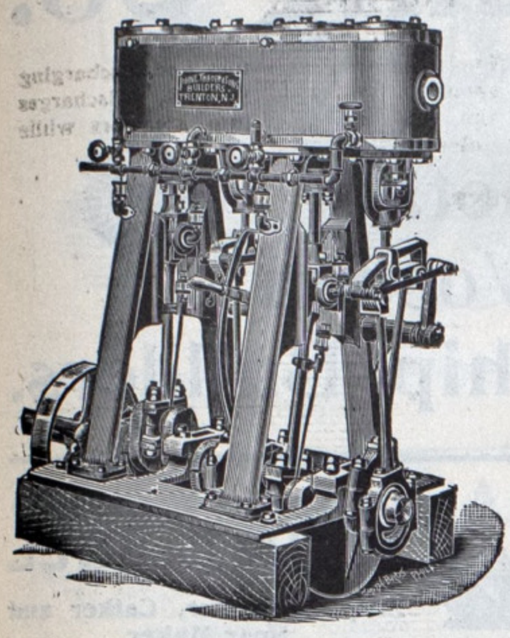
Special attention given to Steel and Iron Work.
Plates Reset and Riveted.

SHIP CARPENTERS AND CALKERS FURNISHED.

Office and Works 21 Main St.
TEL. CLEVELAND, M. 523 F. CUYAHOGA, C. 477
Residence 137 Franklin Ave.
TEL. CLEVELAND, M. 813 J. CUYAHOGA, A. 1067.
All night calls answered from residence.

ALSO WHOLESALE AND RETAIL DEALERS IN SHIP TIMBER.

John E. Thropp & Sons' Co.



BUILDERS OF

Compound and Triple Expansion

ENGINES,

Boilers, Surface Condensers, Propeller Wheels, Etc.

Contracts taken for yachts and tugs complete. Send for photographs of Engines and descriptive pamphlet.

Works on Delaware & Raritan Canal Basin.

TRENTON, N. J.

THE FLUSHOMETER

THE KENNEY SYSTEM.

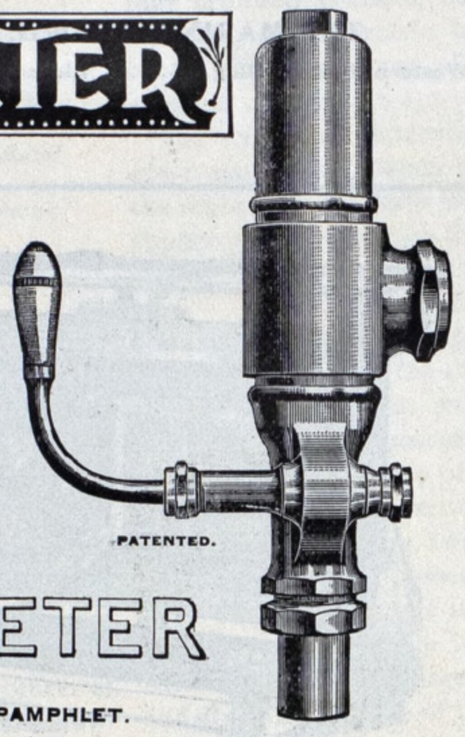
FOR FLUSHING WATER CLOSETS.

NO CUP LEATHERS OR SPRINGS.

The Best System ever Invented for Use on Steam Vessels.

Showing application of Flushometer.

Owners and constructors of Steamships, Yachts and Steamboats have found it indispensable. Used by the U. S. War and Navy Departments. Transports Grant, Sheridan, Burnside, Terry, Hooker, Thomas, Logan, Sherman and others. Also Albany Day Line Steamers; Norfolk and Washington S. S. Line; Steam Yachts Neaira, Aphrodite and Loando, and new Lake Steamers Illinois, Pennsylvania, Angeline and others.



PATENTED.

FLUSHOMETER

TRADE MARK.

SEND FOR ILLUSTRATED PAMPHLET.

THE KENNEY CO., 72-74 Trinity Place, NEW YORK.

YAWLS

AND

LIFE BOATS

IN STOCK.

MICHIGAN YACHT & POWER CO.

DETROIT.

1540 JEFFERSON AVE.

Compasses Adjusted

For deviation, and deviation tables supplied. Great facilities for doing the work by day or night.

John Maurice.

Office, 24-26 Market St., CHICAGO.
Residence, 1213 Albany Avenue.

PRACTICAL MECHANICS.

Applied to the requirements of the sailor. By Thos. McKenzie. Illustrated; 12 mo.; cloth, $1.50, by mail, prepaid. The Marine Record, Western Reserve Bldg., Cleveland, O.

JOHN DONNELLY, SR., PRES.
JOHN DONNELLY, JR., VICE PRES.

H. B. FOLGER, TREAS.
THOS. DONNELLY, SEC'Y.

THE DONNELLY SALVAGE AND WRECKING CO., Ltd.

KINGSTON, ONT.

EXPERIENCED DIVERS, TUGS, STEAM PUMPS, ETC.,

SUPPLIED ON SHORTEST NOTICE.

NEVERSINK CORK JACKET AND LIFE BELT.

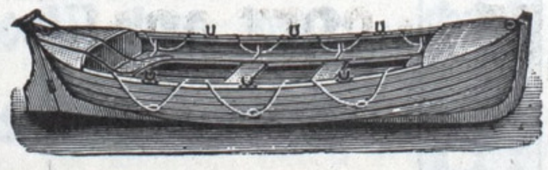
Warranted 24 lb. Buoyancy and full Weight of Cork, as required by U. S. Inspectors. **Consolidated Cork Life Preservers.** Superior to all others. **Rings Buoys and Fenders.** SAFEST CHEAPEST.

Approved and adopted by U. S. Board of Supervising Inspectors.

Also adopted by the principal Ocean, Lake and River Steamer Lines as the only Reliable Life Preserver. Vessels and trade supplied. Send for Catalogue.

Awardad four medals by World's Columbian Exposition.

METALLIC and WOODEN LIFE BOATS.



Metallic Life Rafts, Marine Drags.

Manufacturer of Woolsey's Patent Life Buoy, which is the lightest, cheapest and most compact Life Raft known. Send for illustrated catalogue. Get our prices before buying elsewhere.

D. KAHNWEILER'S SONS, 437 Pearl St., New York City.

IN PRACTICAL USE ON THE BEST AND LARGEST LAKE STEAMERS

Using all Types of Boilers and all Pressures of Steam.

Every Purifier Warranted to Remove all Sediment or Scale-Forming Substance.

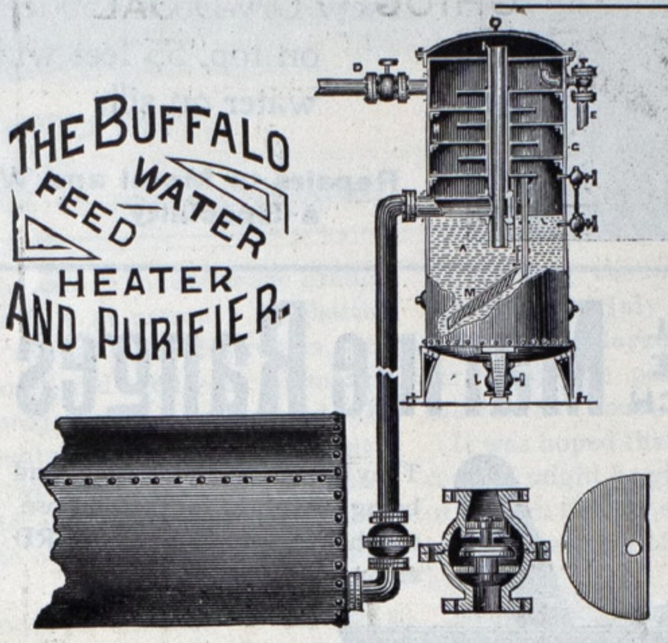
ROBERT LEARMONTH,

PATENTEE,

SEND FOR CIRCULAR.

100 WHITE BLDG., BUFFALO, N. Y.

THE BUFFALO FEED WATER HEATER AND PURIFIER.



NAMES OF STEAMERS ON THE LAKES USING THE BUFFALO FEED WATER HEATER AND PURIFIER:

Zenith Transit Co.'s steamers Empire City, Crescent City, Zenith City, Superior City, Queen City, Pennsylvania and John W. Gates.

The Republic Iron Co.'s steamers America, Brazil, Thomas Maytham and Chili.

Mitchell Transportation Co.'s steamer Hendrick S. Holden.

Minnesota Iron Co.'s steamer Presque Isle.

American Steel Barge Co.'s steamer Alex. McDougall.

Lake Michigan & Lake Superior Transportation Co.'s steamer Manitou.

Bessemer Steamship Co.'s steamers S. F. B. Morse and Douglas Houghton.

American Transportation Co.'s steamers John Harper and Alex. Nimick.

Red Star Line's steamers Robert Mills and Wyoming.

Wilson Transit Line's steamers W. D. Rees and Andrew Carnegie.

And the steamer William R. Linn.

THE CHASE MACHINE COMPANY,

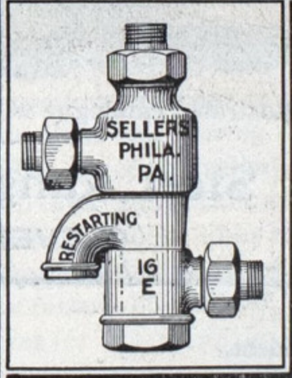
ENGINEERS AND MACHINISTS.

MANUFACTURERS, UNDER THE CHASE PATENTS, OF

Fog Whistle Machines, Hoisting Engines, Steering Engines Automatic Towing Engines, Power and Drop Hammers, and other Machinery. Engineers' Supplies and General Jobbing.

111 ELM STREET. TELEPHONE, MAIN 994. **CLEVELAND, O.**

Sellers' Restarting Injector



A strictly first class machine at moderate cost.

Perfectly automatic, has wide range of capacities, and raises water promptly with hot or cold pipes.

Very simple, has few parts and is easily repaired.

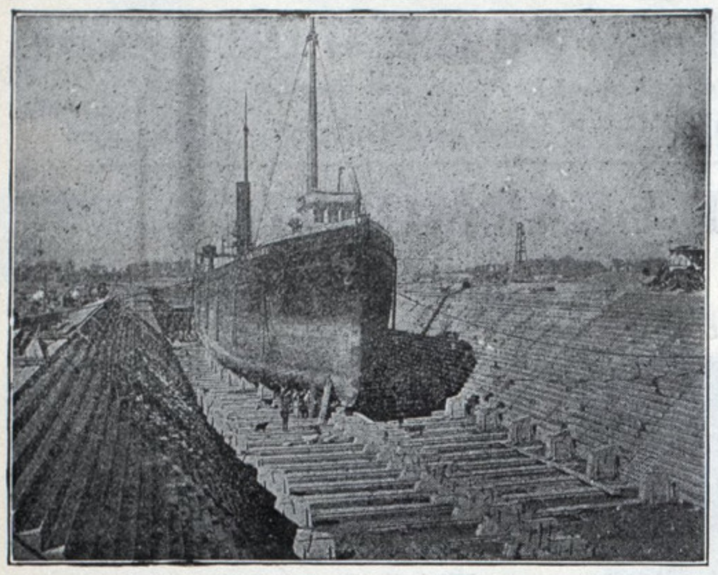
All parts interchangeable, made of the best bronze, and the workmanship is perfect. Send for special catalogue descriptive of this Injector.

JENKINS BROTHERS, Selling Agents
NEW YORK, BOSTON, PHILA., CHICAGO

A. J. MORSE & SON.

DIVING APPARATUS

140 CONGRESS ST. BOSTON.



Craig Ship Building Co.

TOLEDO, OHIO.

New Dry-Dock 450 feet long, 110 feet wide on top, 55 feet wide on bottom, 16 feet water on sill.

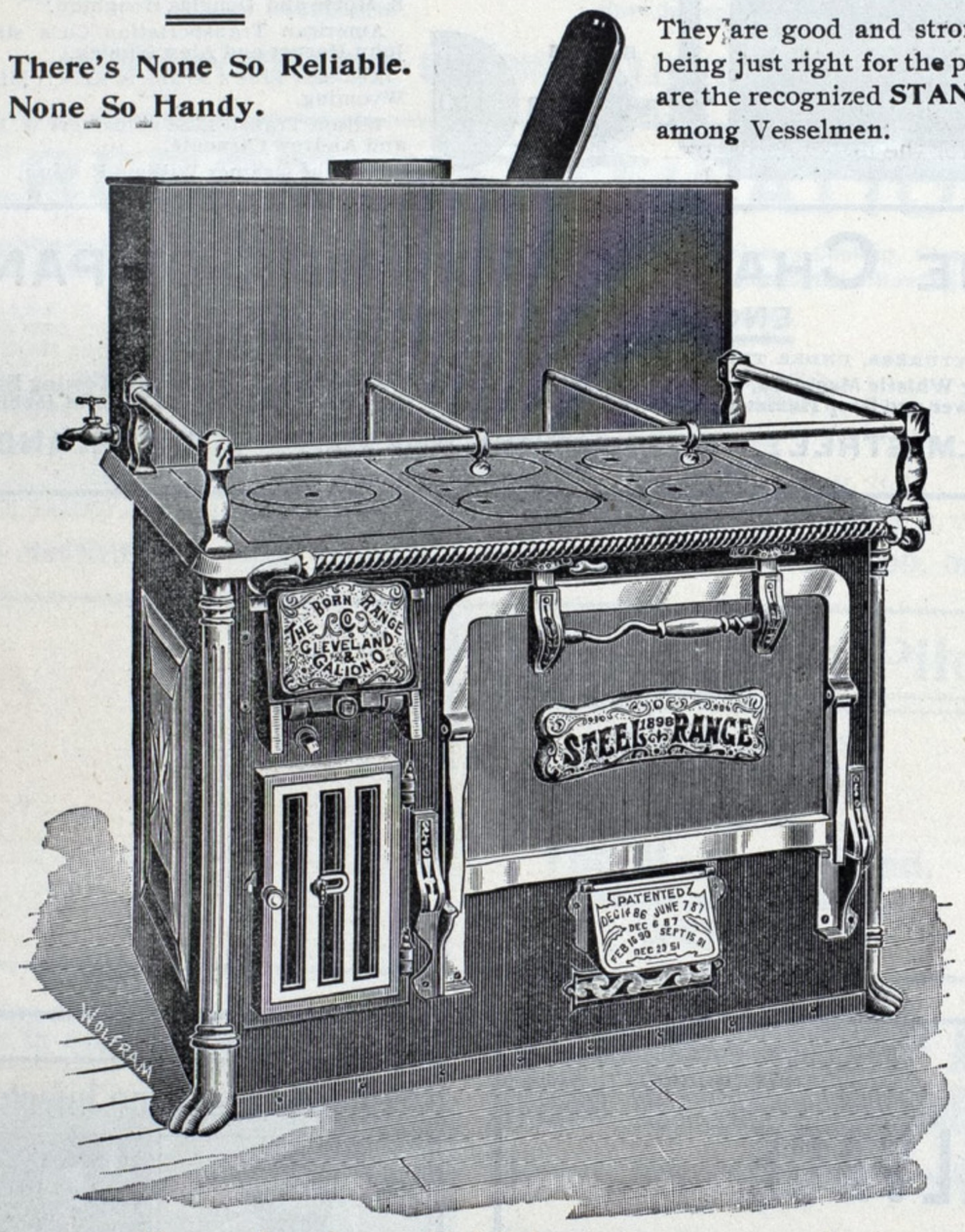
Repairs to Metal and Wooden Ships a Specialty.

Metal and Wooden Ship Builders.

The Born STEEL PLATE FRENCH Marine Ranges

There's None So Reliable. None So Handy.

They are good and strong, and being just right for the purpose, are the recognized **STANDARD** among Vesselmen.



Large illustrated catalogue with full description sent on application.

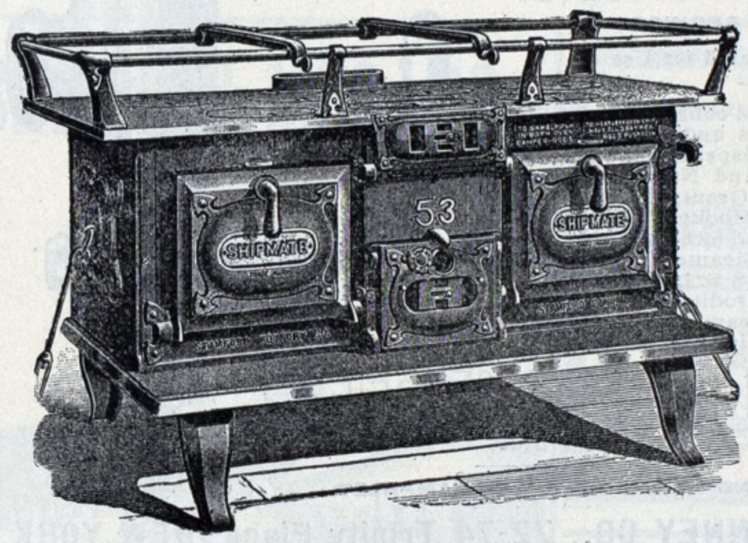
The Born Steel Range and Manufacturing Co.
CLEVELAND, OHIO.

Elementary Seamanship.

By D. Wilson Barker. Illustrated; 12 mo.; cloth, $2.00 by mail prepaid.

THE MARINE RECORD,
Western Reserve Bldg., Cleveland, Ohio.

JOHN C. JOLL
Ship Carpenter, Calker and Spar Maker.
Jobbing of all kinds promptly attended to.
'PHONES { MAIN 523 L. / WEST 808 F. 45 Main St.,
Residence, 1097 Franklin Ave. CLEVELAND, O.



SHIPMATE RANGES.

The U. S. Government; railroad companies having large floating equipments; the owners of the largest schooners built; yacht owners; ship, bark and brig owners; and owners of almost every other kind of vessel, use Shipmate Ranges.

Sold by
Robt. C. Bialy, 923-925 Water St., Bay City, Mich.
Soo Hardware Co., Sault Ste. Marie, Mich.

THE STAMFORD FOUNDRY COMPANY,
STAMFORD, CONN.
Established 1830.

SCOTT'S COAST PILOT FOR THE LAKES.

PRICE, $1.50.

FOR SALE BY THE MARINE RECORD, WESTERN RESERVE BLDG., CLEVELAND, O.

W. S. JENKS, President. O. L. JENKS, Vice Pres. and Treas. A. M. CARPENTER, Sec. and Gen'l Mgr.

The Jenks Ship Building Co.

Office and Machine Shops
Fourth Street.
Yards
Foot of Lincoln Ave.

Steel and Wood Ship Builders.
Marine Engines and Boilers.

Port Huron, Mich.

STEAM WINDLASSES CAPSTANS AND STEERING APPARATUS